Solicitation DA14001

DEPARTMENT OF HEALTH-UPGRADE FIRE RATED CORRIDOR DOORS / 12188390

Bid designation: Public

DFCM

Bid DA14001
DEPARTMENT OF HEALTH-UPGRADE FIRE RATED CORRIDOR DOORS / 12188390

Bid Number	**DA14001**
Bid Title	**DEPARTMENT OF HEALTH-UPGRADE FIRE RATED CORRIDOR DOORS / 12188390**
Expected Expenditure	**$185,000.00** (This price is expected - not guaranteed)
Bid Start Date	**Nov 14, 2013 2:17:00 PM MST**
Bid End Date	**Dec 17, 2013 2:30:00 PM MST**
Question & Answer End Date	**Dec 5, 2013 3:30:00 PM MST**
Bid Contact	**Craig Wessman** **DFCM** **801-673-2107** **cwessman@utah.gov**
Bid Contact	**Denise Austin** **VBS Program Coordinator** **DFCM** **801-538-3708** **daustin@utah.gov**
Contract Duration	**One Time Purchase**
Contract Renewal	**Not Applicable**
Prices Good for	**45 days**
Pre-Bid Conference	**Nov 21, 2013 10:30:00 AM MST** **Attendance is optional** **Location: Cannon Health Bldg. Room 114** **288 North 1460 West** **Salt Lake City, Utah**
Pre-Bid Conference	**Nov 21, 2013 10:30:00 AM MST** **Attendance is mandatory** **Location: Cannon Health Bldg. Room 114** **288 North 1460 West** **Salt Lake City, Utah**
Bid Comments	This project is upgrading the existing doors in this building. The majority of the existing doors will remain with the existing door hardware removed and replaced with new ADA compliant hardware. The work also includes the addition of access control, card readers, and some minor video monitoring system modification. There is an existing security/video system in the building which is to remain. All new or relocated devices will be required to connect to the existing system. The work also includes the removal and replacement of an employee vestibule storefront system with new sliding entrance doors, access control and some exterior concrete replacement. Work in the building will only be allowed during normal business hours, Monday through Friday, 7 AM to 6 PM.

Changes made on Nov 15, 2013 9:00:58 AM MST

Conference on Nov 21, 2013 10:30:00 AM MST as been added

Item Response Form

Item	**DA14001--01-01 - Base Bid**
Quantity	**1 lump sum**
Unit Price	
Subcontractor's List Due 12/18/2013	

Liquidated Damages $110 per day	
Completion Date 03/28/2014	
# of DFCM Addenda Received	
Business Organization Type	
Contractor's License #	

Delivery Location **DFCM**

DFCM
4110 State Office Bldg.
Salt Lake City UT 84114
Qty 1

Description

Upgrades to the doors, access control, and employee entrance replacement

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

MULTI-STEP BIDDING PROCESS
FOR
CONTRACTORS

Request For Solicitation For Construction Services

Stage II – General Contractors Bidders List FY13

November 14, 2013

UPGRADE FIRE RATED CORRIDOR DOORS CANNON HEALTH BUILDING

DEPARTMENT OF HEALTH SALT LAKE CITY, UTAH

DFCM Project No. 12188390

Tracy Stocking & Associates
17 Exchange Place
Salt Lake City, Utah

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Technical Specifications:
Drawings:

Current copies of the DFCM General Conditions dated May 25, 2005 and all Supplemental General Conditions are available upon request at the DFCM office and on the DFCM web site at www.dfcm.utah.gov - "Standard Documents" – "Reference Documents" – "Supplemental General Conditions", and are hereby made part of these contract documents by reference.

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at www.dfcm.utah.gov.

INVITATION TO BID

ONLY FIRMS PRE-QUALIFIED DURING STAGE I OF THE RFS ARE ALLOWED TO BID ON THIS PROJECT

The State of Utah - Division of Facilities Construction and Management (DFCM) is requesting bids for the construction of the following project:

UPGRADE FIRE RATED CORRIDOR DOORS-CANNON HEALTH BUILDING
DEPARTMENT OF HEALTH-SALT LAKE CITY, UTAH
DFCM PROJECT NO:

Project Description: This project is upgrading the existing doors in this building. Most of the doors are to remain with new hardware installed along with extension of some security readers, access control, and some minor video monitoring system modification. There are a limited number of new doors and hardware to be installed. Also includes the removal and replacement of an employee vestibule storefront system and new sliding entrance doors along with some exterior concrete replacement. **Construction Cost Estimate**: $185,000

FY2013 Prequalified General Contractors

Bailey Construction	MW Construction
Benstog Construction	North Ridge Construction
Broderick & Henderson Construction	Patriot Construction LLC
Bud Mahas Construction	Paulsen Construction
Buxton Inc	Raymond Construction
Carter Enterprises	Rod Lewis Construction
Chad Husband Construction	Saunders Construction
CK Construction	Spindler Construction
CRC Construction	Tri-Hurst Construction
Hughes General Contractors	Valley Design & Construction
Landmark Companies	Wadman Construction
Lundahl Building Systems	Wasatch West Contracting
Miller General Contractors	

The bid documents will be available at 4:00 PM on Thursday November 14, 2013 on the DFCM web page at http://dfcm.utah.gov. See Project Description on page 4 for contact information.

A **MANDATORY** pre-bid meeting and site visit will be held at 10:30 AM on Thursday November 21, 2013 at Cannon Health Bldg. Room 114, 288 North 1460 West, Salt Lake City, Utah. All visitors must sign-in at the security station inside the main lobby before proceeding to Room 114. All pre-qualified prime contractors wishing to bid on this project must attend this meeting.

Bids are to be submitted electronically through a secure mailbox at BidSync (www.bidsync.com) until **2:30 PM on Tuesday December 17, 2013.** It is the sole responsibility of the contractor to ensure their bid reaches BidSync before the closing date and time. There is no cost to the contractor to submit electronic bids via BidSync. Electronic bids may require the uploading of electronic attachments. The submission of attachments containing embedded documents (i.e., zip files, .mov, wmp, and mp3 files, etc.) is prohibited. All documents should be attached as separate files. Questions about using BidSync, please call customer service at 801-765-9245 option 1, option 1.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond, shall accompany the bid submission and uploaded in BidSync. **If the bid bond is not furnished with the bid through bidsync, the BID is NONRESPONSIVE.**

The Division of Facilities Construction & Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of the State.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
Room 4110 State Office Building-Capitol Hill Complex
Salt lake City, Utah 84114

PROJECT DESCRIPTION

Contact Information:
Project Specific Questions: All questions are to be submitted in writing through BidSync (www.bidsync.com). Refer to Project Schedule for deadline.
Bidsync Technical/Bidding Questions: Bidsync Customer Service 801-765-9245 Option 1, Option 1 or www.bidsync.com.
DFCM Project Manager: Craig Wessman Phone: 801 673-2107.

Project Description: This project is upgrading the existing doors in this building. The majority of the existing doors will remain with the existing door hardware removed and replaced with new ADA compliant hardware. The work also includes the addition of access control, card readers, and some minor video monitoring system modification. There is an existing security/video system in the building which is to remain. All new or relocated devices will be required to connect to the existing system. The work also includes the removal and replacement of an employee vestibule storefront system with new sliding entrance doors, access control and some exterior concrete replacement. Work in the building will only be allowed during normal business hours, Monday through Friday, 7 AM to 6 PM.

Base Bid: Upgrades to the doors, access control, and employee entrance replacement

Alternates, if any: None

Liquidated Damages: $110 per day.

STAGE II - MULTI-STEP BIDDING PROCESS

ONLY FIRMS PRE-QUALIFIED DURING STAGE I OF THE RFS ARE ALLOWED TO BID ON THIS PROJECT

1. Invitational Bid Procedures

Each pre-qualified firm will be notified via e-mail from Bidsync when a project is ready for Construction Services to invite them to bid on the project.

2. Drawings and Specifications and Interpretations

Drawings, specifications and other contract documents may be obtained as stated in the Invitation to Bid. If any firm is in doubt as to the meaning or interpretation of any part of the drawings, specifications, scope of work or contract documents, they shall submit a request for interpretation through Bidsync's web site at www.bidsync.com by the question deadline identified in the schedule. Answers to questions and interpretations will be made via addenda issued by DFCM. Neither DFCM or the designer shall be responsible for incorrect information obtained by contractors from sources other than the official drawings/specifications and addenda issued by DFCM.

3. Product Approvals

Where reference is made to one or more proprietary products in the contract documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the contract documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the Designer. Such written approval must occur prior to the deadline established for the last scheduled addendum to be issued. The Designer's written approval will be included as part of the addendum issued by DFCM. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the Designer.

4. Mandatory PreBid Site Meeting

If a firm fails to attend a pre-bid site meeting labeled "Mandatory" they will not be allowed to bid on the project. At the mandatory meeting, contractors may have an opportunity to inspect the site, receive additional instructions and ask questions about the project. The schedule contains information on the date, time, and place of the mandatory pre-bid site meeting.

5. Addenda

All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on Bidsync's web site at www.bidsync.com . Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged when the bid is submitted electronically through www.bidsync.com. Failure to acknowledge addenda shall result in disqualification from bidding. DFCM shall not be responsible for incorrect information obtained by contractors from sources other than official addenda issued by DFCM.

6. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the Contractor, Subcontractor or Sub-subcontractor. Failure to respond may result in suspension from DFCM's list of pre-qualified contractors.

7. Licensure

The Contractor shall comply with and require all of its Subcontractors to comply with the license laws as required by the State of Utah.

8. Permits

In concurrence with the requirements for permitting in the general conditions, it is the responsibility of the contractor to obtain the fugitive dust plan requirements from the Utah Division of Air Quality and the SWPPP requirements from the Utah Department of Environmental Quality and submit the completed forms and pay any permit fee that may be required for this specific project. Failure to obtain the required permit may result in work stoppage and/or fines from the regulating authority that will be the sole responsibility of the contractor. Any delay to the project as a result of any such failure to obtain the permit or noncompliance with the permit shall not be eligible for any extension in the Contract Time.

9. Time is of the Essence

Time is of the essence in regard to all the requirements of the contract documents.

10. Bids

Before submitting a bid, each bidder shall carefully examine the contract documents; shall visit the site of the work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the contract documents including those added via addenda. If the bidder observes that portions of the contract documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Project Manager. Changes necessary to correct these issues will be made via addenda issued by DFCM.

Bids are to be submitted electronically through a secure mailbox BidSync (www.bidsync.com) until the date and time on the Project Schedule. It is the sole responsibility of the contractor to ensure their bid reaches BidSync before the closing date and time. There is no cost to the contractor to submit electronic bids via BidSync. Electronic bids may require the uploading of electronic attachments. The submission of attachments containing embedded documents (i.e., zip files, .mov, wmp, and mp3 files, etc.) is prohibited. All documents should be attached as separate files.

A bid bond properly signed by a qualified surety, as indicated on the DFCM Bid Bond form provided along with this Instruction to Bidders, in the amount of 5% of the bid, shall accompany the bid submission and uploaded in BidSync. **If the bid bond is not furnished with the bid through Bidsync, the BID is NONRESPONSIVE.** THIS BID BOND MUST BE ON THE DFCM BID BOND FORM PROVIDED WITH THIS INSTRUCTION TO BIDDERS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID unless only one bid is received by DFCM, or the failure to comply with the bid bond requirements is determined by the Director of DFCM to be nonsubstantial based on the following:

A. the bid bond is submitted on a form other than DFCM's required Bid Bond form and the bid bond meets all other requirements including being issued by a surety firm authorized to do business in the State of Utah and be listed in the U.S. Department of the Treasury Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies for an amount not less than the amount of the bond to be issued. A co-surety may be utilized to satisfy this requirement; and

B. the contractor provides a bid bond properly signed by a qualified surety and on the required DFCM Bid Bond form by the close of business of the next succeeding business day after the DFCM notifies the bidder of the defective bid bond.

A CASHIER'S CHECK CANNOT BE USED AS A SUBSTITUTE FOR A BID BOND.

11. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", included as part of the contract documents. The subcontractors list shall be delivered to DFCM or e-mailed to marlaworkman@utah.gov within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the contract documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements may be suspended from DFCM's list of pre-qualified contractors.

12. Contract and Bond

The Contractor's Agreement will be in the form provided in this document. The duration of the contract shall be for the time indicated by the project completion deadline shown on the schedule. The successful bidder, simultaneously with the execution of the Contractor's Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents.

The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the Contract Sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for Subcontractors will be specified in the Supplementary General Conditions.

13. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of DFCM to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc. Alternates will be selected in prioritized order up to the construction cost estimate.

14. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

15. Withdrawal of Bids

Bids may be withdrawn on written request received from bidders within 24 hours after the bid opening if the contractor has made an error in preparing the bid.

Multi-Step Bidding Process Stage II
Page No. 4

16. DFCM Contractor Performance Rating and Pre-Qualification Status

As a contractor completes each project, DFCM will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project may affect the firm's "pre-qualified" status and their ability to obtain future work with DFCM. Contractors shall remain on DFCM's list of pre-qualified contractors provided: (a) they maintain a performance rating of **4.0** or greater on each project, (b) they are not suspended for failure to comply with requirements of their contract, (c) the firm has not undergone a significant reorganization involving the loss of key personnel (site superintendents, project managers, owners, etc.) to a degree such that the firm no longer meets the pre-qualification requirements outlined in Stage I, (d) the financial viability of the firm has not significantly changed, and (e) the firm is not otherwise disqualified by DFCM. Note: If a contractor fails to comply with items (a) through (e) above, they may be removed from DFCM's list of pre-qualified contractors following an evaluation by a review committee. Contractors will be given the opportunity to address the review committee before a decision is made. Pre-qualified contractors are ONLY authorized to bid on projects within the discipline that they were originally pre-qualified under.

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

Stage II - PROJECT SCHEDULE
BIDSYNC BID # DA14001

PROJECT NAME: **UPGRADE FIRE RATED CORRIDOR DOORS-CANNON HEALTH BLDG DEPARTMENT OF HEALTH-SALT LAKE CITY, UTAH**

DFCM PROJECT NO: **12188390**

Event	Day	Date	Time	Place
Stage II Bidding Documents Available	Thursday	November 14, 2013	4:00 PM	DFCM web site *
Mandatory Pre-bid Site Meeting	Thursday	November 21, 2013	10:30 AM	Cannon Health Bldg. Room 114 288 North 1460 West Salt Lake City, Utah
Deadline for Submitting Questions	Thursday	December 5, 2013	3:30 PM	BidSync Web site**
Addendum Deadline (exception for bid delays)	Wednesday	December 11, 2013	3:30 PM	BidSync Web site**
Prime Contractors Turn in Bid and Bid Bond	Tuesday	December 17, 2013	2:30 PM	BidSync Web site**
Subcontractors List Due	Wednesday	December 18, 2013	2:30 PM	DFCM 4110 State Office Building SLC, UT E-mail: daustin@utah.gov
Substantial Completion Date	Friday	March 28, 2014		

NOTE: * DFCM's web site address is **www.dfcm.utah.gov**.
** BidSync web site address is **www.bidsync.com**.

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By: _____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

STATE OF _____)
) ss.
COUNTY OF _____)

By: _____
Attorney-in-Fact (Affix Corporate Seal)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

INSTRUCTION AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, based on the following:

DOLLAR AMOUNTS FOR LISTING

PROJECTS UNDER $500,000: ALL FIRST-TIER SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE: ALL FIRST-TIER SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- If there are no subcontractors for the job that are required to be reported by State law (either because there are no subcontractors that will be used on the project or because there are no first-tier subcontractors over the dollar amounts referred to above), then you do not need to submit a sublist. If you do not submit a sublist, it will be deemed to be a representation by you that there are no subcontractors on the job that are required to be reported under State law. At any time, DFCM reserves the right to inquire, for security purposes, as to the identification of the subcontractors at any tier that will be on the worksite.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such

INSTRUCTIONS AND SUBCONTRACTORS LIST FORM
Page No. 2

other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONTRACTOR LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self" *	$300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	$298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: $350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

* Bidders may list "self", but it is not required.

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

SUBCONTRACTORS LIST

daustin@utah.gov

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

l. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR OWNER'S REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY OWNER. ATTACH A SECOND PAGE IF NECESSARY.

DFCM Project No. _____
DFCM Contract No. _____

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 and all Supplemental General Conditions ("also referred to as General Conditions") on file at the office of DFCM and available on the DFCM website (http://dfcm.utah.gov/StdDocs/index.html), are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which

is the base bid, and which sum also includes the cost of a 100% Performance Bond and a 100% Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete by _____. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

CONTRACTOR'S AGREEMENT
PAGE NO. 3

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

CONTRACTOR'S AGREEMENT
PAGE NO. 4

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

CONTRACTOR'S AGREEMENT
PAGE NO. 5

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO FORM:
ATTORNEY GENERAL
January 2, 2013
By: ALAN S. BACHMAN
Asst Attorney General

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

*/S/ DFCM
DFCM

Approved for expenditure:

*/S/ Division of Finance
Division of Finance

Approved as to availability of funds:

*/S/ David D.Williams, Jr.
David D. Williams, Jr.
CBA Financial Director

* Electronic signatures are effective when the AIM Status History page is attached to this agreement following this signature page. The AIM Status History page identifies the State signatures.

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____ (Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____ (Seal)

Attorney-in-Fact

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management | **DFCM**

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

The Owner acknowledges receipt of the following closeout and transition materials:

Record Drawings O & M Manuals Warranty Documents Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of_____. (Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ ____calendar days from the above date of issuance of this Certificate. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____ by: _____

CONTRACTOR (include name of firm) (Signature) DATE

_____ by: _____

A/E (include name of firm) (Signature) DATE

_____ by: _____

USING INSTITUTION OR AGENCY (Signature) DATE

_____ by: _____

DFCM (Owner) (Signature) DATE

4110 State Office Building, Salt Lake City, Utah 84114
telephone 801-538-3018 • facsimile 801-538-3267 • http://dfcm.utah.gov

cc: Parties Noted
DFCM, Director

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

PAST PERFORMANCE RATING EVALUATION

Date_____ Evaluator_____ FVN#_____

Reference checked for _____
Name of Contractor or A/E

- ☐ Corporation
- ☐ Partnership
- ☐ LLC
- ☐ Individual or Sole Proprietorship
- ☐ Other _____

Address City Zip

Phone Fax Firm Contact Name

Project referenced *(Name of Project, Agency, Location)*

Project Completion Date *(MM/YYYY)* Contract Amount $

Reference Contact *(Name/Title)* Reference Contact Phone *(000-000-0000)*

What did the firm do for you? *(e.g. design work, construction service, cost auditing, studies, commissioning, other.)*

Rating Guideline	QUALITY OF PRODUCT OR SERVICES	COST CONTROL	TIMELINESS OF PERFORMANCE	BUSINESS RELATIONS
5-Exceptional	Contractor/AE has demonstrated an exceptional performance level in any of the above four categories that justifies adding a point to the score. Contractor performance clearly exceeds the performance levels described as "Very Good"			
4-Very Good	Contractor/AE is in compliance with contract requirements and/or delivers quality product/service	Contractor/AE is effective in managing costs and submits current, accurate, and complete billings	Contractor/AE is effective in meeting milestones and delivery schedule	Response to inquiries, technical/service/ administrative issues is effective
3-Satisfactory	Minor inefficiencies/errors have been identified	Contractor/AE is usually effective in managing cost	Contractor/AE is usually effective in meeting milestones and delivery schedules	Response to inquires technical/service/administrative issues is somewhat effective
2-Marginal	Major problems have been encountered	Contractor/AE is having major difficulty managing cost effectively	Contractor/AE is having major difficulty meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is marginally effective
1-Unsatisfactory	Contractor/AE is not in compliance and is jeopardizing achievement of contract objectives	Contractor/AE is unable to manage costs effectively	Contractor/AE delays are jeopardizing performance of contract objectives	Response to inquiries, technical/service/administrative issues is not effective

Rate The Following	Rating 1-5 (5 = Highest)	Comments
Quality of Product or Service		
Cost Control		
Timeliness of Performance		
Business Relations		
OVERALL RATING		***Signature of Rater*:**_____

4110 State Office Building, Salt Lake City, Utah 84114 · telephone 801-538-3018 · facsimile 801-538-3267 · www.dfcm.utah.gov

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

Stage II - PROJECT SCHEDULE
BIDSYNC BID # DA14001

PROJECT NAME: **UPGRADE FIRE RATED CORRIDOR DOORS-CANNON HEALTH BLDG DEPARTMENT OF HEALTH-SALT LAKE CITY, UTAH**

DFCM PROJECT NO: **12188390**

Event	Day	Date	Time	Place
Stage II Bidding Documents Available	Thursday	November 14, 2013	4:00 PM	DFCM web site *
Mandatory Pre-bid Site Meeting	Thursday	November 21, 2013	10:30 AM	Cannon Health Bldg. Room 114 288 North 1460 West Salt Lake City, Utah
Deadline for Submitting Questions	Thursday	December 5, 2013	3:30 PM	BidSync Web site**
Addendum Deadline (exception for bid delays)	Wednesday	December 11, 2013	3:30 PM	BidSync Web site**
Prime Contractors Turn in Bid and Bid Bond	Tuesday	December 17, 2013	2:30 PM	BidSync Web site**
Subcontractors List Due	Wednesday	December 18, 2013	2:30 PM	DFCM 4110 State Office Building SLC, UT E-mail: daustin@utah.gov
Substantial Completion Date	Friday	March 28, 2014		

NOTE: * DFCM's web site address is **www.dfcm.utah.gov**.
** BidSync web site address is **www.bidsync.com**.

STATE OF UTAH, DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

CANNON HEALTH BUILDING

UPGRADE FIRE RATED CORRIDOR DOORS

288 NORTH 1460 WEST SLC, UT

PROJECT NUMBER: 12188390

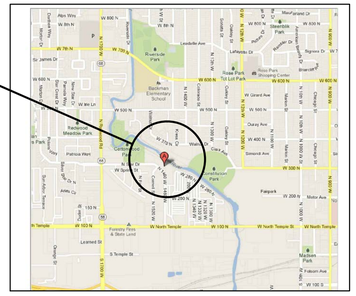
State of Utah—Department of Administrative Services

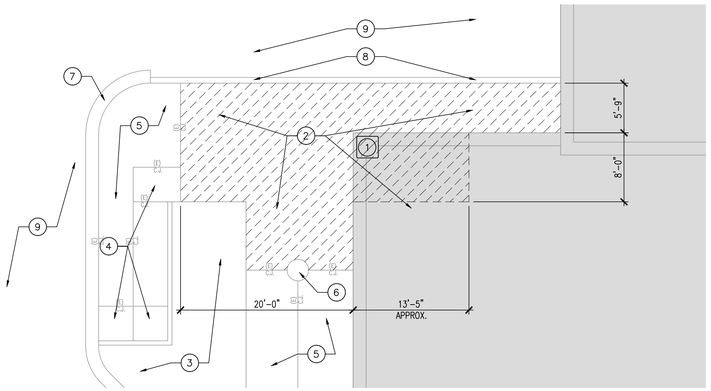
DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

4110 State Office Building/Salt Lake City, Utah 84114/538-3018

PROJECT LOCATION MAP

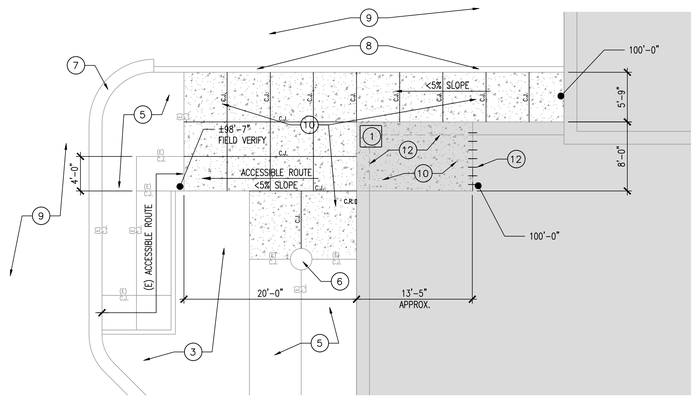
PROJECT LOCATION





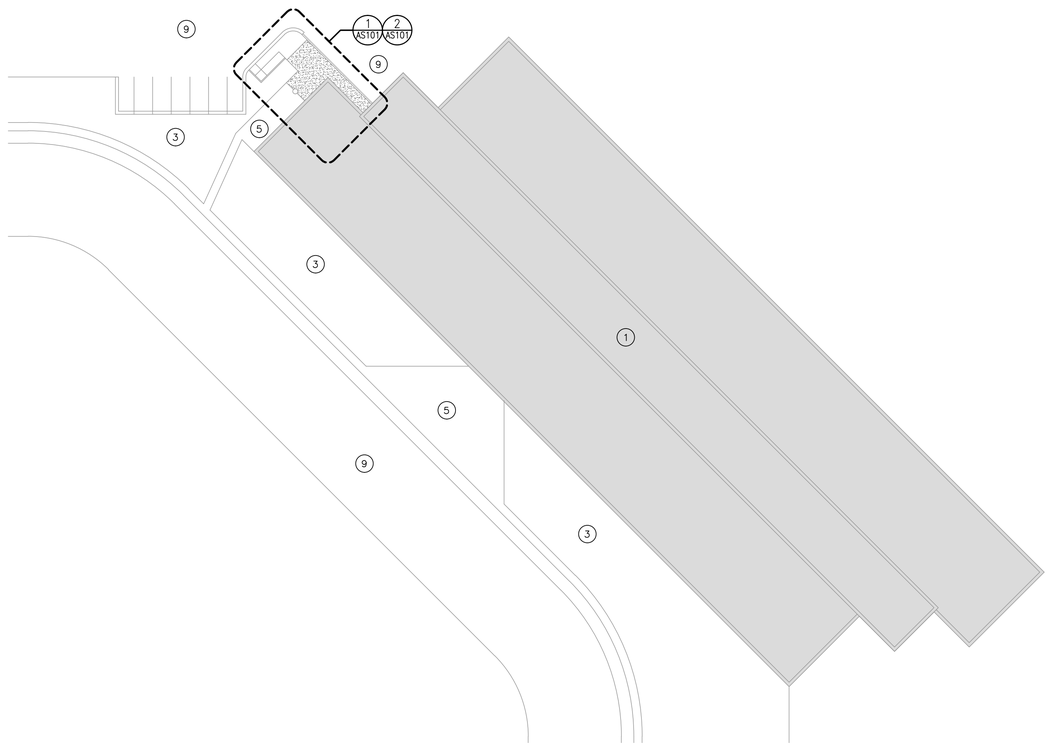
ENLARGED DEMOLITION PARTIAL SITE PLAN

SCALE: 1/8" = 1'-0"



ENLARGED NEW PARTIAL SITE PLAN

SCALE: 1/8" = 1'-0"



EXISTING SITE PLAN

SCALE: 1" = 40'-0"

PLAN KEY NOTES

1. (E) BUILDING COLUMN
2. REMOVE A PORTION OF (E) CONCRETE PAVING TO JOINT LINE – COORDINATE WITH DEMOLITION FLOOR PLAN. EXCAVATE AS NEEDED FOR NEW WORK
3. (E) GRASS AND TREES TO REMAIN – PROTECT IN PLACE
4. (E) CONCRETE ADA SLOPED WALKWAY TO REMAIN – PROTECT IN PLACE
5. (E) CONCRETE PAVING TO REMAIN – PROTECT IN PLACE
6. (E) MAN HOLE COVER TO REMAIN – PROTECT IN PLACE
7. (E) CONCRETE GUTTER TO REMAIN – PROTECT IN PLACE
8. (E) CONCRETE RETAINING WALL & GUARD RAIL TO REMAIN – PROTECT IN PLACE
9. (E) ASPHALT PAVING TO REMAIN – PROTECT IN PLACE
10. NEW 4" CONCRETE OVER 4" COMPACTED AGGREGATE BASE. SAW CUT CONTROL JOINTS 1" DEEP
11. TURN DOWN SLAB EDGE 18" BELOW FINISH GRADE. MINIMUM 6" WIDE
12. (7) #4 SMOOTH BAR 12" LONG @ 12 O.C. MAX DOWELED 6" DEEP IN (E) SLAB

GENERAL NOTES

1. VERIFY ALL EXISTING CONSTRUCTION – IF CONDITIONS VARY FROM DRAWINGS NOTIFY THE ARCHITECT
2. REPAIR TO LIKE NEW CONDITION ANY EXISTING FINISH DAMAGED DURING DEMOLITION OR CONSTRUCTION.
3. REPAIR WALLS WERE (E) DOORS, WALLS, FURNISHINGS, ELECTRICAL DEVICES, OR OTHER ITEMS ARE REMOVED
4. ALL DIMENSIONS ARE TO FACE OF FINISH
5. CONTRACTOR SHALL VISIT SITE PRIOR TO BIDDING IN ORDER TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS
6. ALL ITEMS TO BE SALVAGED FOR RE-USE OR TO OWNER ARE TO BE PROTECTED AND REMOVED AND RE-INSTALLED WITHOUT DAMAGE
7. ALL DEMOLITION DEBRIS, TRASH, AND/OR REMOVED ITEMS SHALL BE HAULED OFF SITE AND DISPOSED OF IN A LEGAL MANNER
8. SEE MECHANICAL DRAWINGS FOR MECHANICAL INFORMATION
9. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL INFORMATION
10. EXISTING DOORS TO REMAIN ARE NOT NUMBERED
11. PRIOR TO START OF DEMOLITION MEET W/ OWNER TO SELECT ALL ITEMS TO BE SALVAGED
10. DEMOLISH, REMOVE AND DISPOSE OF ALL ITEMS SHOWN DASHED ON DEMOLITION PLAN. INCLUDE ALL RELATED UTILITIES AND ACCESSORIES

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services
Division of Facilities Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267
http://dfcm.utah.gov

DFCM STAMP

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO:	12188390
CAD PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	
CHK'D BY:	
COPYRIGHT:	STATE OF UTAH

SHEET TITLE

SITE PLAN & ENLARGED SITE PLAN

SHEET NUMBER

AS101

SHEET 2 OF 19

GENERAL NOTES

1. VERIFY ALL EXISTING CONSTRUCTION – IF CONDITIONS VARY FROM DRAWINGS NOTIFY THE ARCHITECT
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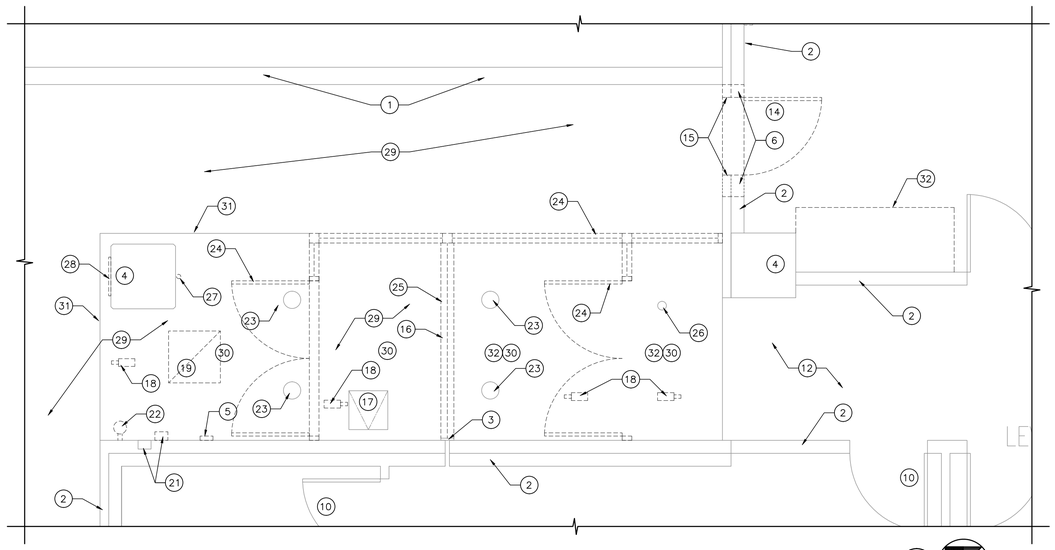
11. DEMOLISH, REMOVE AND DISPOSE OF ALL ITEMS SHOWN DASHED ON DEMOLITION PLAN. INCLUDE ALL RELATED UTILITIES AND ACCESSORIES



ENLARGED DEMOLITION VESTIBULE PLAN (1/–)

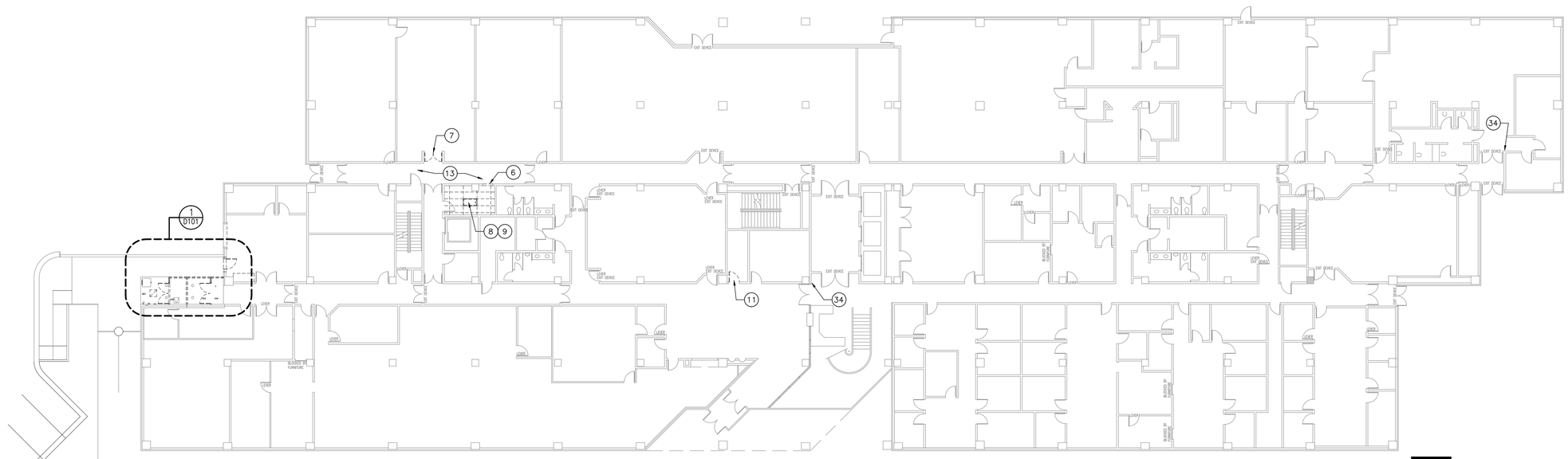
SC: 3/8" = 1'–0"

(XX) PLAN KEY NOTES

1. (E) CONCRETE RETAINING WALL TO REMAIN – PROTECT IN PLACE
2. (E) BUILDING WALL SYSTEM TO REMAIN PROTECT IN PLACE
3. (E) ALUMINUM COVER TO REMAIN – PROTECT IN PLACE
4. (E) COLUMN TO REMAIN PROTECT IN PLACE
5. REMOVE & RELOCATE (E) CARD READER
6. REMOVE A PORTION OF (E) STEEL STUD & GYPSUM BOARD WALL FOR NEW DOOR INSTALLATION – SEE NEW FLOOR PLAN
7. REMOVE (E) DOOR(S) COMPLETE. (E) HOLLOW METAL FRAME TO REMAIN – PROTECT IN PLACE
8. (E) ACOUSTICAL SUSPENDED CEILING GRID SYSTEM TO REMAIN – PROTECT IN PLACE
9. REMOVE & RELOCATE LIGHT FIXTURE – SEE ELECTRICAL DRAWINGS
10. (E) DOOR TO REMAIN – PROTECT IN PLACE
11. REMOVE (E) DOOR & SALVAGE FOR REINSTALL @ DOOR 111

(XX) PLAN KEY NOTES - CONTINUED

12. (E) WALK–OFF CARPET TILE TO REMAIN – PROTECT IN PLACE
13. (E) CARPET TO REMAIN – PROTECT IN PLACE
14. REMOVE (E) DOOR, FRAME AND HARDWARE COMPLETE
15. REMOVE A PORTION OF (E) BRICK VENEER WALL ASSEMBLY AS NECESSARY FOR NEW DOOR INSTALLATION & (N) CARD READER – SEE NEW FLOOR PLAN
16. REMOVE (E) CONCRETE SLAB UP TO THIS (E) SLOPE TRANSITION LINE – SEE SITE PLAN
17. (E) CEILING ACCESS DOOR TO REMAIN. RE–PAINT TO MATCH NEW CEILING PAINT COLOR
18. REMOVE (E) DOOR SENSOR – SEE ELECTRICAL DRAWINGS. PATCH AND REPAIR CEILING IN PREPARATION FOR NEW PAINT
19. REMOVE (E) EXHAUST VENT AND CAP ABOVE CEILING. PATCH AND REPAIR CEILING IN PREPARATION FOR NEW PAINT
20. NOT USED
21. (E) RECESSED & SURFACE MOUNTED KEY BOXES TO BE REMOVED. RETURN TO DFCM
22. REMOVE & RELOCATE (E) SECURITY CAMERA – SEE ELECTRICAL DRAWINGS
23. (E) EXISTING RECESSED DOWN LIGHTS TO REMAIN – PROTECT IN PLACE
24. REMOVE (E) STOREFRONT WINDOW AND DOOR SYSTEM COMPLETE
25. REMOVE (E) CEILING ALUMINUM COVER COMPLETE. PATCH AND REPAIR CEILING IN PREPARATION FOR NEW PAINT
26. (E) SECURITY CAMERA TO REMAIN – PROTECT IN PLACE
27. REMOVE (E) SURFACE MOUNTED ELECTRICAL CONDUIT – SEE ELECTRICAL DRAWINGS. PATCH & REPAIR COLUMN AS NECESSARY
28. REMOVE (E) SURFACE MOUNTED SIGN, AND RETURN BACK TO OWNER. CLEAN, PATCH AND REPAIR COLUMN AS NECESSARY
29. REMOVE (E) CONCRETE PAVING – COORDINATE WITH SITE DEMOLITION PLAN
30. (E) FINISHED GYP. BD. CEILING TO REMAIN – PROTECT IN PLACE. PATCH AND REPAIR FINISHED GYP. BD. CEILING AS NECESSARY FOR NEW PAINT. SEE NEW FLOOR PLAN
31. LINE OF (E) BUILDING ABOVE
32. REMOVE (E) COUNTERTOP COMPLETE – BY OWNER
33. REMOVE (E) WALK–OFF CARPET TILE ALONG WITH GLUE RESIDUE COMPLETE. PREPARE FLOOR FOR NEW WALK–OFF CARPET TILE – SEE NEW FLOOR PLAN
34. REMOVE "GREEN" EXIT BUTTON



FIRST LEVEL DEMOLITION FLOOR PLAN

SCALE: 1/16" = 1'–0"

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

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Division of Facilities Construction & Management
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Phone: (801) 538 - 3018
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http://dfcm.utah.gov

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DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO:
CAD DWG FILE:
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CHK'D BY:
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SHEET TITLE

LEVEL ONE DEMOLITION FLOOR PLAN

SHEET NUMBER

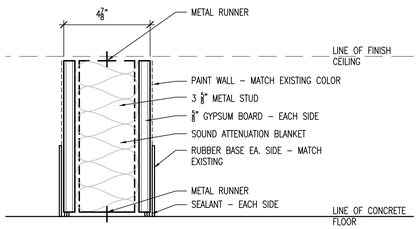
D101

SHEET 3 OF 19

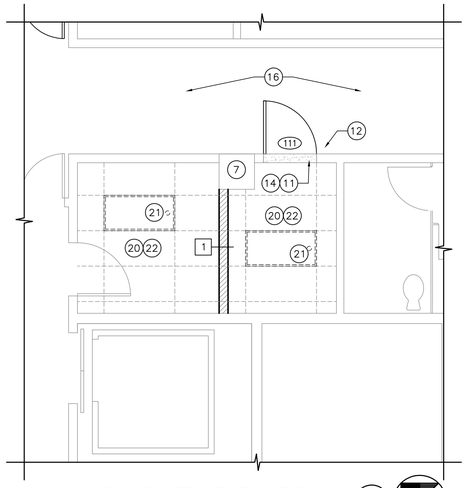
GENERAL NOTES

1. VERIFY ALL EXISTING CONSTRUCTION – IF CONDITIONS VARY FROM DRAWINGS NOTIFY THE ARCHITECT
2. REPAIR TO LIKE NEW CONDITION ANY EXISTING FINISH DAMAGED DURING DEMOLITION OR CONSTRUCTION.
3. REPAIR WALLS WERE (E) DOORS, WALLS, FURNISHINGS, ELECTRICAL DEVICES, OR OTHER ITEMS ARE REMOVED
4. ALL DIMENSIONS ARE TO FACE OF FINISH
5. CONTRACTOR SHALL VISIT SITE PRIOR TO BIDDING IN ORDER TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS
6. ALL ITEMS TO BE SALVAGED FOR RE-USE OR TO OWNER ARE TO BE PROTECTED AND REMOVED AND RE-INSTALLED WITHOUT DAMAGE
7. ALL DEMOLITION DEBRIS, TRASH, AND/OR REMOVED ITEMS SHALL BE HAULED OFF SITE AND DISPOSED OF IN A LEGAL MANNER
8. SEE MECHANICAL DRAWINGS FOR MECHANICAL INFORMATION
9. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL INFORMATION
10. EXISTING DOORS TO REMAIN ARE NOT NUMBERED
11. PRIOR TO START OF DEMOLITION MEET W/ OWNER TO SELECT ALL ITEMS TO BE SALVAGED
12. DEMOLISH, REMOVE AND DISPOSE OF ALL ITEMS SHOWN DASHED ON DEMOLITION PLAN. INCLUDE ALL RELATED UTILITIES AND ACCESSORIES

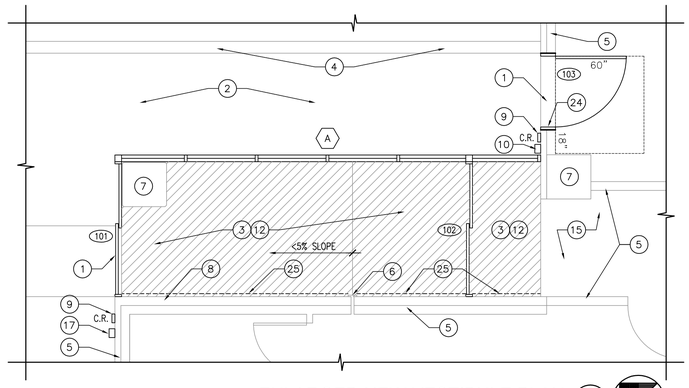
WALL TYPE:


4 1/8"
METAL RUNNER
LINE OF FINISH CEILING
PAINT WALL – MATCH EXISTING COLOR
3 5/8" METAL STUD
5/8" GYPSUM BOARD – EACH SIDE
SOUND ATTENUATION BLANKET
RUBBER BASE EA. SIDE – MATCH EXISTING
METAL RUNNER
SEALANT – EACH SIDE
LINE OF CONCRETE FLOOR

1 UL LISTING: N/A
FIRE/SMOKE RATING: N/A



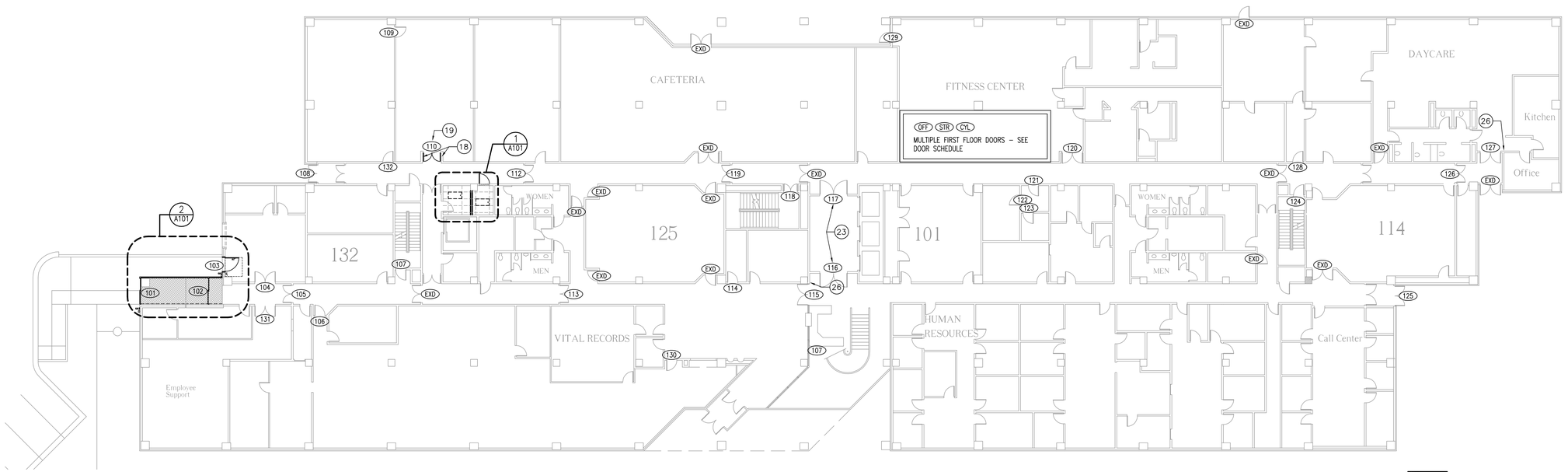
ENLARGED STORAGE PLAN 1/– NORTH
SC: 1/4" = 1'-0"



ENLARGED NEW VESTIBULE PLAN 2/– NORTH
SC: 1/4" = 1'-0"

PLAN KEY NOTES

1. (N) ALUMINUM ADA COMPLIANT THRESHOLD – SEE HARDWARE SCHEDULE
2. (N) CONCRETE PAVING – SEE SHEET AS101
3. (N) WALK-OFF CARPET TILE
4. (E) CONCRETE RETAINING WALL TO REMAIN – PROTECT IN PLACE
5. (E) BUILDING WALL SYSTEM TO REMAIN PROTECT IN PLACE
6. (E) EXPANSION COVER TO REMAIN – PROTECT IN PLACE
7. (E) COLUMN TO REMAIN PROTECT IN PLACE
8. PATCH BRICK @ DEMOLISHED KEY BOX. TOOTH IN NEW BRICK, MATCH (E) BRICK COLOR AND MORTAR
9. NEW OR RELOCATED CARD READER – SEE ELECTRICAL DRAWINGS
10. NEW INTERCOM – SEE ELECTRICAL DRAWINGS
11. PROVIDE CARPET STRIP WHERE WALL WAS REMOVED. MATCH EXISTING CARPET COLOR
12. (N) CEILING PAINT – MATCH EXISTING COLOR
13. MODIFY BASE @ (N) DOOR
14. NEW TRANSITION STRIP – MATCH EXISTING COLOR
15. (E) WALK-OFF CARPET TILE TO REMAIN – PROTECT IN PLACE
16. (E) CARPET – PROTECT IN PLACE
17. NEW KEY BOX. OWNER FURNISHED, CONTRACTOR INSTALLED
18. (E) MAGNETIC HOLD OPENS. REFURBISH OR REPLACE AS NECESSARY TO BE FULLY FUCTIONAL
19. REMOVE CEILING MOUNTED DOOR SENSOR. PATCH & REPAIR SUSPENDED ACOUSTICAL LAY-IN CEILING SYSTEM AS NECESSARY
20. (E) CONCRETE FLOOR – PROTECT IN PLACE
21. RELOCATED AND/OR NEW LIGHT FIXTURE – SEE ELECTRICAL DRAWINGS
22. (E) ACOUSTICAL LAY-IN CEILING SYSTEM TO REMAIN – PROTECT IN PLACE
23. (N) MAGNETIC DOOR HOLDERS. SEE HARDWARE SCHEDULE & ELECTRICAL DRAWINGS
24. GROUT SOLID (N) DOOR FRAME TO CARRY BRICK VENEER ABOVE
25. RESILIENT BASE – MATCH EXISTING
26. PATCH, REPAIR & PAINT WALL @ REMOVED "GREEN" BUTTON LOCATION



LEVEL ONE FLOOR PLAN
SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services
Division of Facilities Construction & Management
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Phone: (801) 538 - 3018
Fax: (801) 538 - 3267
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SIGNATURE: FC
DATE: 10-9-13

BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH TRACY D. STOCKING 9/13/13 LICENSED ARCHITECT

MARK	DATE	DESCRIPTION
ISSUE TYPE:		

ISSUE DATE: 9-13-2013

DFCM PROJECT NO:	12188390
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LEVEL ONE FLOOR PLAN & ENLARGED PLANS

SHEET NUMBER

A101

SHEET 4 OF 19

Bid DA14001
DFCM
11/5/2013 8:03:23 AM

PLAN KEY NOTES

1. (N) MAGNETIC DOOR HOLDERS. SEE HARDWARE SCHEDULE & ELECTRICAL DRAWINGS

GENERAL NOTES

1. VERIFY ALL EXISTING CONSTRUCTION – IF CONDITIONS VARY FROM DRAWINGS NOTIFY THE ARCHITECT
2. REPAIR TO LIKE NEW CONDITION ANY EXISTING FINISH DAMAGED DURING DEMOLITION OR CONSTRUCTION.
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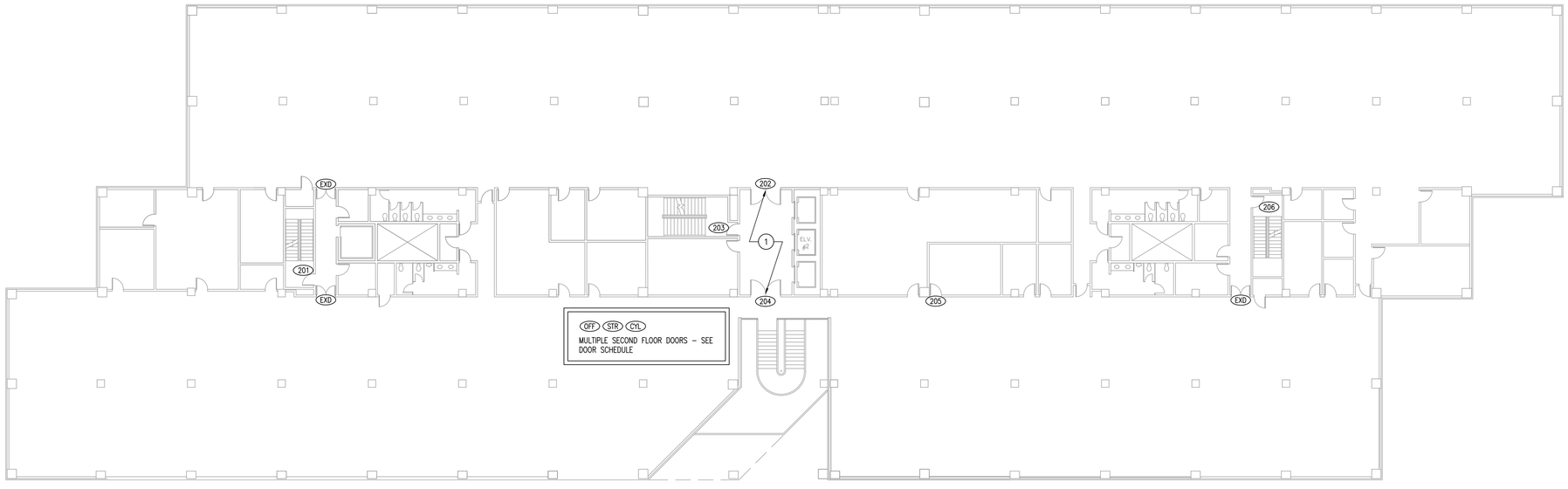

NORTH

LEVEL TWO FLOOR PLAN

SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES

17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services

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UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

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SHEET TITLE

LEVEL TWO FLOOR PLAN

SHEET NUMBER

A102

SHEET 5 OF 19

PLAN KEY NOTES

1. (N) MAGNETIC DOOR HOLDERS. SEE HARDWARE SCHEDULE & ELECTRICAL DRAWINGS

GENERAL NOTES

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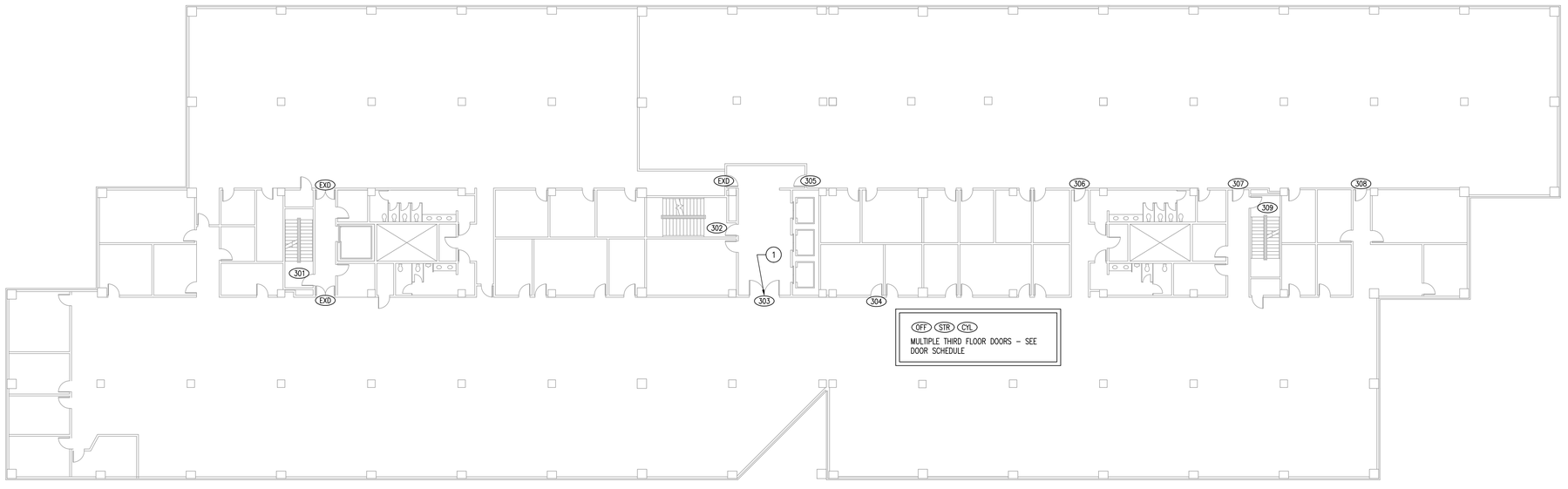

NORTH

LEVEL THREE FLOOR PLAN

SCALE: 1/16" = 1'-0"

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17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

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Division of Facilities Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
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BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

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SHEET TITLE

LEVEL THREE FLOOR PLAN

SHEET NUMBER

A103

SHEET 6 OF 19

PLAN KEY NOTES

1. (N) MAGNETIC DOOR HOLDERS. SEE HARDWARE SCHEDULE & ELECTRICAL DRAWINGS

GENERAL NOTES

1. VERIFY ALL EXISTING CONSTRUCTION – IF CONDITIONS VARY FROM DRAWINGS NOTIFY THE ARCHITECT
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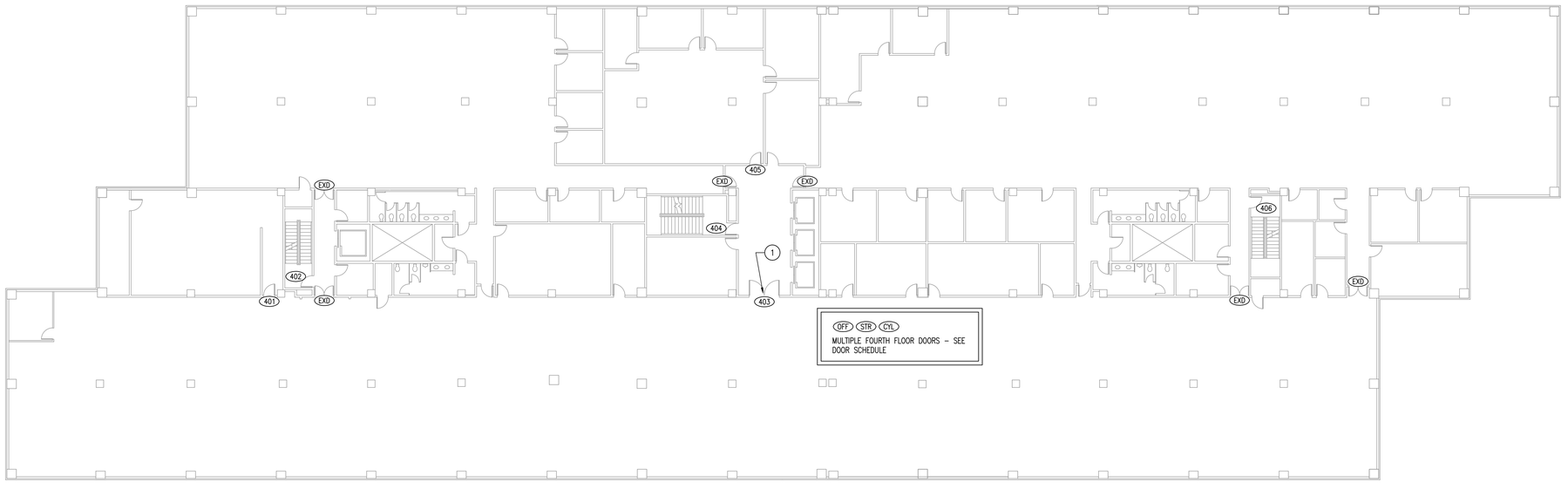

NORTH

LEVEL FOUR FLOOR PLAN

SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES

17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services

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288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

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SHEET TITLE

LEVEL FOUR FLOOR PLAN

SHEET NUMBER

A104

SHEET 7 OF 19

PLAN & RCP KEY NOTES

1. XXXXX

GENERAL NOTES

1. VERIFY ALL EXISTING CONSTRUCTION – IF CONDITIONS VARY FROM DRAWINGS NOTIFY THE ARCHITECT
2. REPAIR TO LIKE NEW CONDITION ANY EXISTING FINISH DAMAGED DURING DEMOLITION OR CONSTRUCTION.
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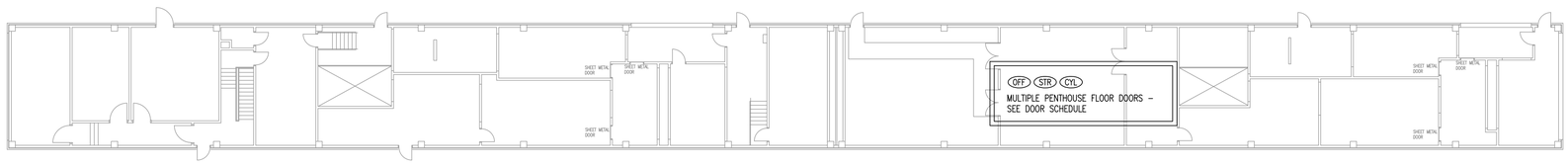

NORTH

PENTHOUSE FLOOR PLAN

SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services
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288 North 1460 West
Salt Lake City, Utah

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UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

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DFCM PROJECT NO:	12188390
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SHEET TITLE

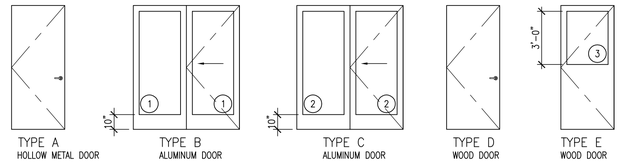
PENTHOUSE FLOOR PLAN

SHEET NUMBER

A105

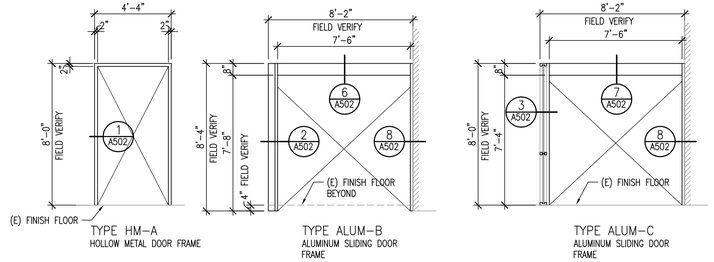
SHEET 8 OF 19

Bid DA14001



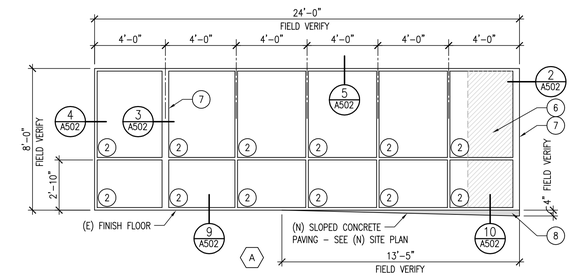
DOOR TYPES:

SCALE: 1/4" = 1'-0"



DOOR FRAME TYPES:

SCALE: 1/4" = 1'-0"



STOREFRONT WINDOW TYPES:

SCALE: 1/4" = 1'-0"

KEY NOTES:

1. (N) 1/4" CLEAR TEMPERED GLAZING
2. (N) 1" CLEAR INSULATED TEMPERED GLAZING
3. (N) 1/4" LAMINATED, MIRRORED, ONE-WAY GLAZING
4. NOT USED
5. NOT USED
6. (E) COLUMN - BEHIND STOREFRONT SYSTEM
7. (N) SLIDING DOOR - BEYOND - SEE FLOOR PLAN
8. (N) ALUMINUM CLOSURE TRIM. COORDINATE WITH SLOPE OF (N) CONCRETE SIDEWALK

DOOR SCHEDULE

MARK	FIRE RATING	TYPE	SIZE WIDTH	SIZE HEIGHT	SIZE THICKNESS	DOOR MATERIAL	DOOR FINISH	FRAME MATERIAL	FRAME TYPE	FRAME FINISH	HARDWARE GROUP	DETAILS HEAD	DETAILS JAMB	DETAILS THRESHOLD	REMARKS
101	-	C	7'-7 1/2"	8'-4"	-	ALUM/GLASS	DK BRNZ	ALUM	ALUM-B	DK BRNZ	1.0	SEE ELEV.	SEE ELEV.	YES	1, 2, 3
102	-	B	7'-7 1/2"	8'-0"	-	ALUM/GLASS	DK BRNZ	ALUM	ALUM-C	DK BRNZ	2.0	SEE ELEV.	SEE ELEV.	-	2
103	-	A	4'-0"	7'-10"	1 3/4"	H.M.	PAINTED	H.M.	HM-A	PAINTED	10.0	1/A502	1/A502	YES	1, 3, 9, 13
104	-	-	(E) PAIR F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	3.0	-	-	-	4, 5
105	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	4.0	-	-	-	4, 7, 13
106	-	-	(E)	-	-	F.V.	F.V.	F.V.	(E)	F.V.	5.0	-	-	-	4, 13
107	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	6.0	-	-	-	4, 5
108	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	7.0				4, 6, 13
109	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
110	45 MIN.	A	PAIR F.V.	FIELD VERIFY	1 3/4"	H.M.	PAINTED	H.M.	(E)	PAINTED	11.0	-	-	-	8, 11, 14
111	-	-	(E)	-	-	WOOD	STAINED	H.M.	HM-A	PAINTED	15.0				10
112	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	4.0				4, 7, 13
113	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	4.0				4, 7, 13
114	-	E	3'-0"	7'-0"	1 3/4"	WOOD	STAINED	H.M.	(E)	PAINTED	16.0			YES	3, 8, 11, 13
115	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	4.0				4, 7, 12, 13
116	-	-	(E) PAIR F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	8.0	-	-	-	4, 5, 15, 17
117	-	-	(E) PAIR F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	8.0	-	-	-	4, 5, 15, 17
118	-	-	(E) PAIR F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	9.0	-	-	-	4, 5
119	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	4.0				4, 7, 13
120	-	-	(E) PAIR F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	4.0				4, 7, 13
121	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
122	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
123	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
124	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	6.0	-	-	-	4, 5
125	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	7.0				4, 6, 13
126	-	-	(E) PAIR F.V.	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	4.0				4, 7, 13
127	-	-	(E) PAIR F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	13.0				4, 6, 12, 13
128	-	-	(E)	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	17.0				4, 13
129	-	-	(E)	-	-	ALUM/GLASS	DK BRNZ	ALUM	(E)	DK BRNZ	5.0				4, 13
130	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
131	-	-	(E) PAIR	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	5.0				4, 13
132	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
201	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	6.0	-	-	-	4, 5
202	-	-	(E) F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	8.0	-	-	-	4, 5, 15, 17
203	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	6.0	-	-	-	4, 5
204	-	-	(E) F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	8.0	-	-	-	4, 5, 15, 17
205	-	-	(E)	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	17.0				4, 11, 13, 16
206	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	6.0	-	-	-	4, 5
301	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	22.0	-	-	-	4, 5, 13
302	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	22.0	-	-	-	4, 5, 13
303	-	-	(E) PAIR F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	8.0	-	-	-	4, 5, 15, 17
304	-	-	(E)	-	-	F.V.	F.V.	F.V.	(E)	F.V.	5.0				4, 13
305	-	-		-	-	WOOD	STAINED	H.M.	(E)	PAINTED	14.0				4, 13
306	-	-	(E)	-	-	F.V.	F.V.	F.V.	(E)	F.V.	5.0				4, 13
307	-	-	(E)	-	-	F.V.	F.V.	F.V.	(E)	F.V.	5.0				4, 13
308	-	-	(E)	-	-	F.V.	F.V.	F.V.	(E)	F.V.	5.0				4, 13
309	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	22.0	-	-	-	4, 5, 13
401	-	-	(E)	-	-	F.V.	F.V.	F.V.	(E)	F.V.	5.0				4, 13
402	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	12.0	-	-	-	4, 5
403	-	-	(E) PAIR F.V.	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	8.0	-	-	-	4, 5, 15, 17
404	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	12.0	-	-	-	4, 5
405	-	-	(E)	-	-	WOOD	STAINED	H.M.	(E)	PAINTED	5.0				4, 13
406	-	-	(E) F.V.	-	-	H.M.	PAINTED	H.M.	(E)	PAINTED	12.0	-	-	-	4, 5
CYL	-	-	-	-	-	-	-	-	-	-	21.0				
EXO	F.V.	-	(E)	-	-	VARIES	-	VARIES	(E)	VARIES	18.0				5
OFF	-	-	(E)	-	-	VARIES	-	VARIES	(E)	VARIES	19.0				18
STR	-	-	(E)	-	-	VARIES	-	VARIES	(E)	VARIES	20.0				18

DOOR SCHEDULE - NOTES

1. PROVIDE ADA COMPLIANT THRESHOLD
2. AUTOMATIC SLIDING DOOR SYSTEM
3. CARD ACCESS SYSTEM
4. (E) DOOR AND FRAME TO REMAIN. TOUCH-UP DAMAGED DOOR & FRAME FINISH
5. REMOVE (E) EXIT DEVICE AND REPLACE WITH (N) EXIT DEVICE TO MATCH DOOR TYPE. VERIFY AND MATCH (E) DOOR RATING. TOUCH-UP DOOR FINISH AS REQUIRED
6. REMOVE (E) EXIT DEVICE. CONNECT (N) EXIT DEVICE TO (E) MAG LOCK. VERIFY AND MATCH (E) DOOR RATING. TOUCH-UP DOOR FINISH AS REQUIRED
7. REMOVE (E) PUSH BAR. CONNECT (N) TOUCH PAD TO (E) MAG LOCK. VERIFY AND MATCH (E) DOOR RATING. TOUCH-UP DOOR FINISH AS REQUIRED
8. REMOVE (E) DOOR AND PROVIDE (N) DOOR. (E) FRAME TO REMAIN
9. INSULATED DOOR
10. SALVAGED DOOR. SEE KEYNOTE 11, SHEET D101
11. MODIFY (E) FRAME FOR (N) DOOR HARDWARE. TOUCH-UP FRAME FINISH AS REQUIRED
12. DISCONNECT AND REMOVE "GREEN" EXIT BUTTON. PATCH, REPAIR AND PAINT ADJACENT WALL AT BUTTON LOCATION
13. SEE HARDWARE GROUP FOR WORK BY ELECTRICAL CONTRACTOR
14. ACTIVE/INACTIVE LEAF
15. REMOVE (E) CONCEALED CLOSER IN DOOR FRAME HEAD. MODIFY FRAME FOR (N) CONCEALED CLOSER AND PATCH, REPAIR AND PAINT FRAME AS REQUIRED
16. REMOVE (E) MAG LOCK. CONNECT (N) STRIKE TO (E) CARD READER
17. UNDERCUT (E) DOOR TO SWING CLOSED OVER (E) FLOOR FINISH. UNDERCUT TO BE A MAX. OF 3/4" AFF
18. REMOVE EXISTING KNOB LOCKSET AND INSTALL LEVER LOCKSET PER QUANTITY LISTED IN HARDWARE GROUP ON DOORS AS DIRECTED BY DFCM/BUILDING LOCKSMITH

State of Utah
Department of Administrative Services
Division of Facilities Construction & Management
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Salt Lake City, Utah 84114
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DFCM STAMP

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO:
CAD DWG FILE:
DRAWN BY:
CHK'D BY:
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SHEET TITLE

DOOR SCHEDULE, DOOR & FRAME TYPES, WINDOW TYPES

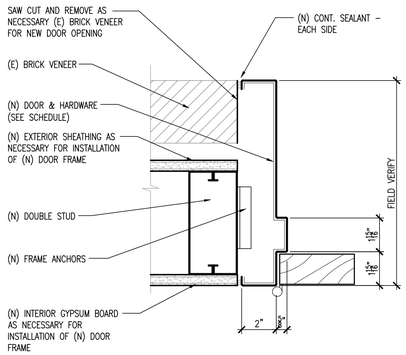
SHEET NUMBER

A501

SHEET 9 OF 19

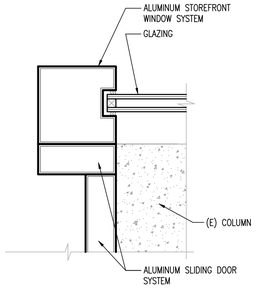
TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

DFCM
p. 35
11/5/2013 9:03:03 AM


SAW CUT AND REMOVE AS NECESSARY (E) BRICK VENEER FOR NEW DOOR OPENING
(N) CONT. SEALANT – EACH SIDE
(E) BRICK VENEER
(N) DOOR & HARDWARE (SEE SCHEDULE)
(N) EXTERIOR SHEATHING AS NECESSARY FOR INSTALLATION OF (N) DOOR FRAME
(N) DOUBLE STUD
(N) FRAME ANCHORS
(N) INTERIOR GYPSUM BOARD AS NECESSARY FOR INSTALLATION OF (N) DOOR FRAME
FIELD VERIFY
1 5/8"
1 5/8"
2"
3/4"

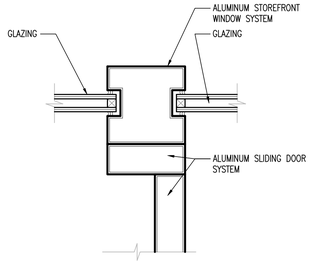
1/– DOOR JAMB DETAIL

SC: 3" = 1'–0" HEAD SIMILAR



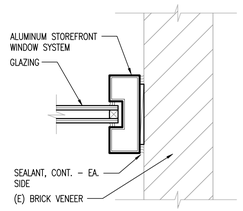
2/– ALUMINUM JAMB DETAIL

SC: 3" = 1'–0"



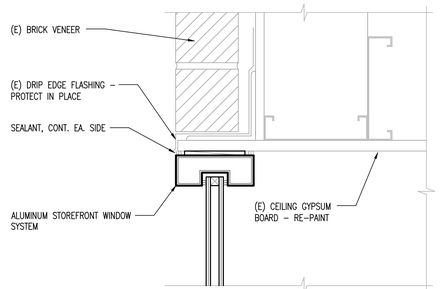
3/– ALUMINUM JAMB DETAIL

SC: 3" = 1'–0"



4/– ALUMINUM JAMB DETAIL

SC: 3" = 1'–0"


(E) BRICK VENEER
(E) DRIP EDGE FLASHING – PROTECT IN PLACE
SEALANT, CONT. EA. SIDE
ALUMINUM STOREFRONT WINDOW SYSTEM
(E) CEILING GYPSUM BOARD – RE–PAINT

5/– ALUMINUM HEAD DETAIL

SC: 3" = 1'–0"

(E) BRICK VENEER
SEALANT, CONTINUOUS
BREAK METAL FLASHING, DARK BRONZE. SAW CUT (E) GROUT TO INSERT FLASHING
(E) DRIP EDGE FLASHING – PROTECT IN PLACE
SEALANT, CONT. EA. SIDE
1/8"
SEALANT, CONTINUOUS
ALUMINUM SLIDING DOOR SYSTEM
(E) CEILING GYPSUM BOARD – RE–PAINT

6/– SLIDING DOOR HEAD DETAIL

SC: 3" = 1'–0"

6" METAL STUD AT 16" O.C. ATTACHED TO STRUCTURE ABOVE WITH MINIMUM 2 DIAGONAL BRACING AT 48" O.C. – STAGGERED
REMOVE A PORTION OF (E) GYPSUM BOARD CEILING AS NECESSARY FOR SLIDING DOOR SUPPORT METAL STUD INSTALLATION
(E) CEILING GYPSUM BOARD – RE–PAINT
SEALANT, CONTINUOUS
ALUMINUM SLIDING DOOR SYSTEM

7/– SLIDING DOOR HEAD DETAIL

SC: 3" = 1'–0"

8/– ALUMINUM JAMB DETAIL

SC: 3" = 1'–0"

9/– ALUMINUM SILL DETAIL

SC: 3" = 1'–0"

10/– ALUMINUM SILL DETAIL

SC: 3" = 1'–0"

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
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Division of Facilities Construction & Management
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DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

STATE OF UTAH
TRACY D. STOCKING
9/13/13
155781
LICENSED ARCHITECT

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO:
CAD DWG FILE:
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SHEET TITLE

DETAILS

SHEET NUMBER

A502

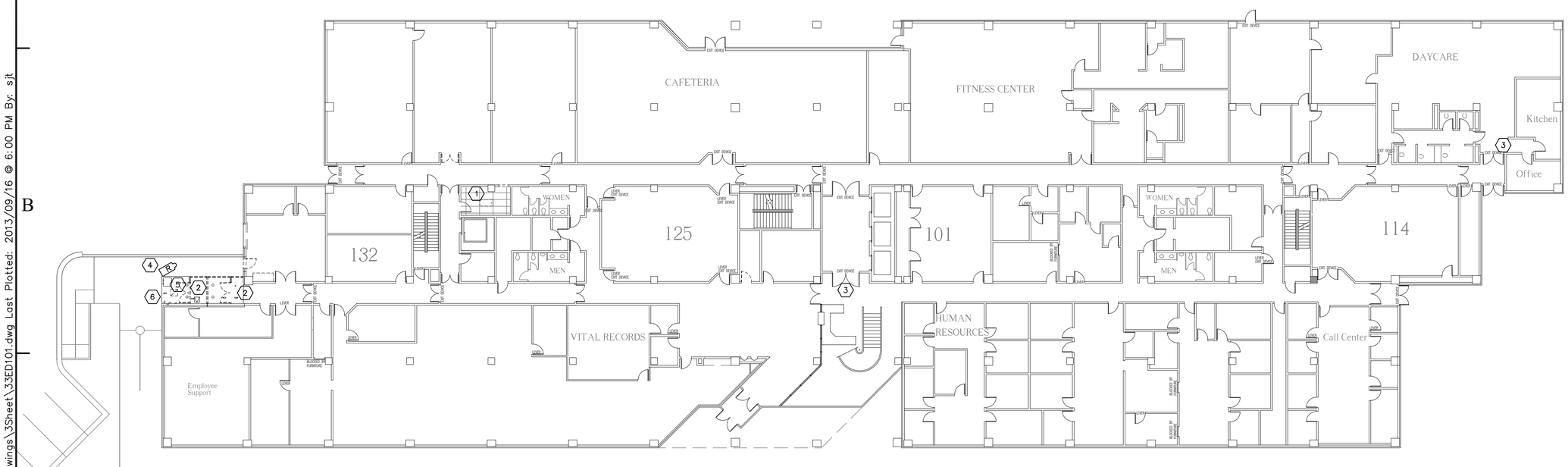
SHEET 10 OF 19

GENERAL SHEET NOTES

1. COORDINATE ELECTRICAL DEMOLITION WORK WITH ARCHITECTURAL.

SHEET KEYNOTES

1. REMOVE AND RELOCATE EXISTING 2x4 FT FLUORESCENT LIGHTING FIXTURE TO ALLOW ADDITION OF WALL AT COLUMN AND ADDITION OF NEW CEILING.
2. REMOVE AUTO-DOOR MOTION DETECTORS AND DISCONNECT AUTO-DOOR POWER FOR CONSTRUCTION. RECONNECT POWER TO NEW AUTO-DOOR AFTER INSTALLATION.
3. REMOVE DOOR EXIT REQUEST BUTTON, BOX, AND WIRING FROM DOOR.
4. REMOVE AND RELOCATE EXISTING CAMERA. PROVIDE NEW WIRING REQUIRED.
5. REMOVE EXISTING SURFACE MOUNTED CONDUIT AND WIRING FROM COLUMN.
6. REMOVE AND RELOCATE EXISTING CARD READER FOR CONSTRUCT



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DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
LIC. NO. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33ED101
DRAWN BY: RXR
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SHEET TITLE

FIRST LEVEL SECURITY DEMOLITION PLAN

SHEET NUMBER

ED101

SHEET 11 OF 19

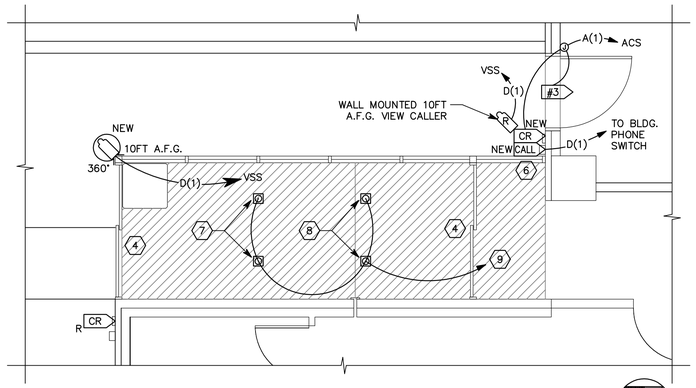
File Name: P:\2013\20130233\1Drawings\3Sheet\33ED101.dwg Last Plotted: 2013/09/16 @ 6:00 PM By: sjt

GENERAL SHEET NOTES

1. PROVIDE ACCESS CONTROL SYSTEM WORK AS INDICATED. PROVIDE EXPANSION OF EXISTING S2 SYSTEM CONTROLLERS AS REQUIRED FOR NEW CARD READER DOORS INDICATED A/R.
2. ALL EXISTING DOORS HAVE RECENTLY UPGRADED CABLE WITH 10 FT. COILED ABOVE DOOR. PROVIDE NEW CABLING AT NEW ACCESS CONTROL DOORS TO MATCH EXISTING.
3. PROVIDE ADDITIONAL ACCESS DOOR DEVICES AS INDICATED AND CONNECT TO EXISTING WIRE PAIRS AND PROVIDE WIRING CONNECTION TO NEW LOCKING AND RELEASE HARDWARE AS INDICATED.
4. PROVIDE NEW END OF LINE RESISTOR AT EACH NEW AND EXISTING ACCESS CONTROL DOOR DOOR POSITION SWITCH, AND REQUEST TO EXIST SWITCH. PROGRAM AND TEST EACH DOOR FOR OPEN AND SHORT-CIRCUIT SUPERVISION.
5. WIRE AND PROGRAM EACH EXISTING ACCESS CONTROL DOOR TO INDICATE FORCED OPEN CONDITIONS IN WHICH A DOOR IS OPENED WITHOUT A PROCEEDING AUTHORIZED CARD READ OR EXIT REQUEST SIGNAL.
6. PROVIDE WIRING, POWER, AND PROGRAMING OF EXISTING FIRE ALARM SYSTEM FOR NEW HELD-OPEN DOOR CLOSERS INDICATED.

SHEET KEYNOTES

1. PROVIDE EXIT MOTION DETECTOR AND DOOR POSITION SWITCH AT INDICATED ELECTRIC STRIKE ACCESS CONTROL DOOR.
2. PROVIDE NEW DOOR POSITION SWITCH, MOTION DETECTOR, AND WIRING CONNECTION TO NEW ELECTRIC STRIKE LOCKING HARDWARE AT INDICATED ACCESS CONTROL DOOR. REFER TO CARD ACCESS DOOR TYPE SCHEDULE FOR REQUIREMENTS.
3. PROVIDE DOOR POSITION SWITCHES AND WIRING TO NEW SWITCHED EXIT HARDWARE TO INTERRUPT POWER TO EXISTING MAG-LOCKS UPON OPERATION OF EXIT DOOR HARDWARE. REMOVE EXISTING MOTION DETECTOR AND PATCH AND PAINT SURFACE A/R. REFER TO CARD ACCESS DOOR TYPE #4 FOR REQUIREMENTS.
4. MAINTAIN EXISTING ACTIVE TAG AUTO-DOOR INTERFACE AND OPERATION AT INDICATED AUTOMATIC ACCESS CONTROL DOOR.
5. PROVIDE FIRE ALARM POWER, FLUSH BOX, POWER, WIRING, AND PROGRAMMING FOR CONTROL OF NEW DOOR HOLD OPEN DEVICES AT INDICATED DOOR.
6. PROVIDE A VIKING MODEL E-30-EWP HANDS FREE TELEPHONE WITH VE-5X5 SURFACE BACK BOX AT AT INDICATED LOCATION (OR PRE-APPROVED EQUIVALENT). INCLUDE ENTRY PHONE CONTROLLER/CALL ROUTER AND REMOTE TOUCH TONE CONTROLLER FOR CALL ROUTING TO AND DOOR RELEASE BY BUILDING TELEPHONE SYSTEM.
7. REMOVE EXISTING 277V CIRCUIT FROM INDICATED EXISTING CAN FIXTURES AND REPLACE EXISTING METAL BULBS WITH NEW COMPATIBLE 277V FLUORESCENT BULBS. DELIVER REMOVE EQUIPMENT TO OWNER.
8. REMOVE EXITING 120V BALLASTS FROM EXISTING FLUORESCENT CAN FIXTURES AND REPLACE WITH NEW 277V BALLASTS.
9. TO 277V EMERGENCY LIGHTING PANEL. PROVIDE NEW 277V EMERGENCY CIRCUIT TO EXISTING 277V EMERGENCY PANEL LOCATED 25 FT AWAY.
10. REINSTALL EXISTING 2x4 FT LIGHTING FIXTURE IN NEW CEILING AND WIRE TO EXISTING LIGHT SWITCH CIRCUIT.
11. PROVIDE NEW 2x4 FT FLUORESCENT LIGHTING FIXTURE TO MATCH EXISTING IN NEW CEILING WITH NEW LIGHT SWITCH. WIRE TO EXISTING LIGHTING C/B.
12. PROVIDE DOOR POSITION SWITCH AND WIRING CONNECTION TO NEW ELECTRIC EXIT HARDWARE DEVICES WITH EXIT REQUEST SWITCHES AT INDICATED ACCESS CONTROL DOOR. REFER TO CARD ACCESS DOOR TYPE #2 FOR REQUIREMENTS.
13. PROGRAM EXISTING VIDEO SURVEILLANCE SYSTEM TO DISPLAY DOCK ENTRY DOOR CAMERA UPON CALL FROM ACTIVATION OF NEW CALL BOX. COORDINATE PROGRAMMING OF BUILDING PBX WITH OWNER TO DIRECT CALLS TO RECEIVING AREA UPON

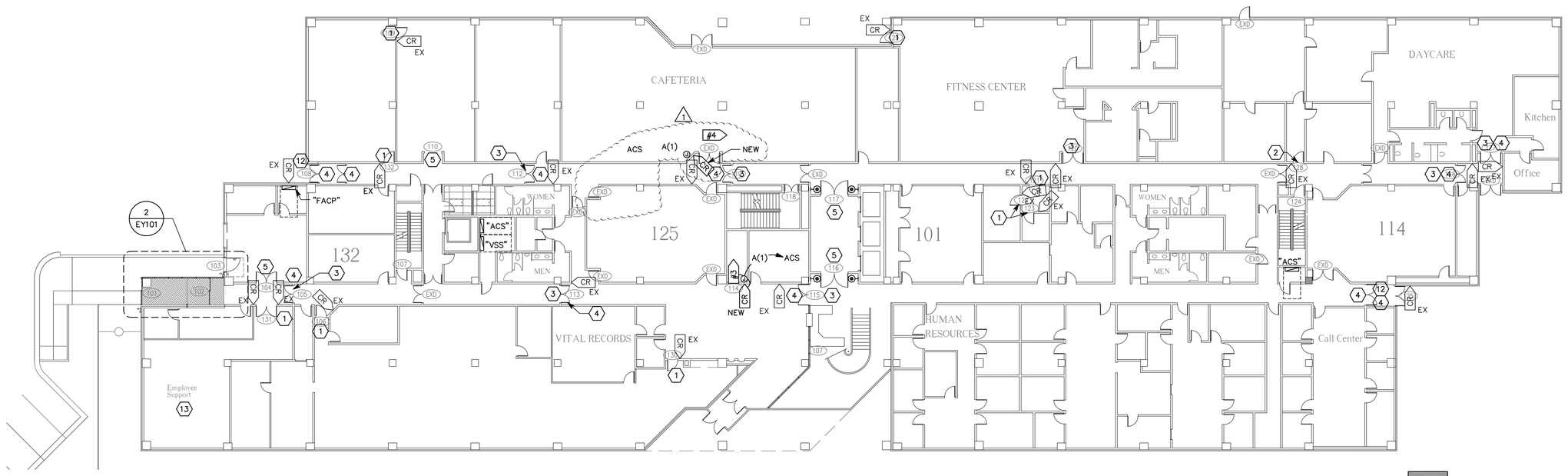


ENLARGED NEW VESTIBULE ELECTRICAL LIGHTING PLAN

SC: 1/4" = 1'-0"

2 EY101

NORTH



NORTH

LEVEL ONE SECURITY PLAN

SCALE: 1/16" = 1'-0"

1 EY101

TRACY STOCKING & ASSOCIATES

17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services

Division of Facilities Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
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DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9 - 16 - 13

MARK	DATE	DESCRIPTION
1	10/01/2013	OWNER REQUESTED REVISIONS

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO:	12188390
CAD PROJECT NO:	20130233RN
CAD DWG FILE:	33EY101
DRAWN BY:	RXR
CHK'D BY:	RPN
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SHEET TITLE

LEVEL ONE SECURITY PLAN

SHEET NUMBER

EY101

SHEET 12 OF 19

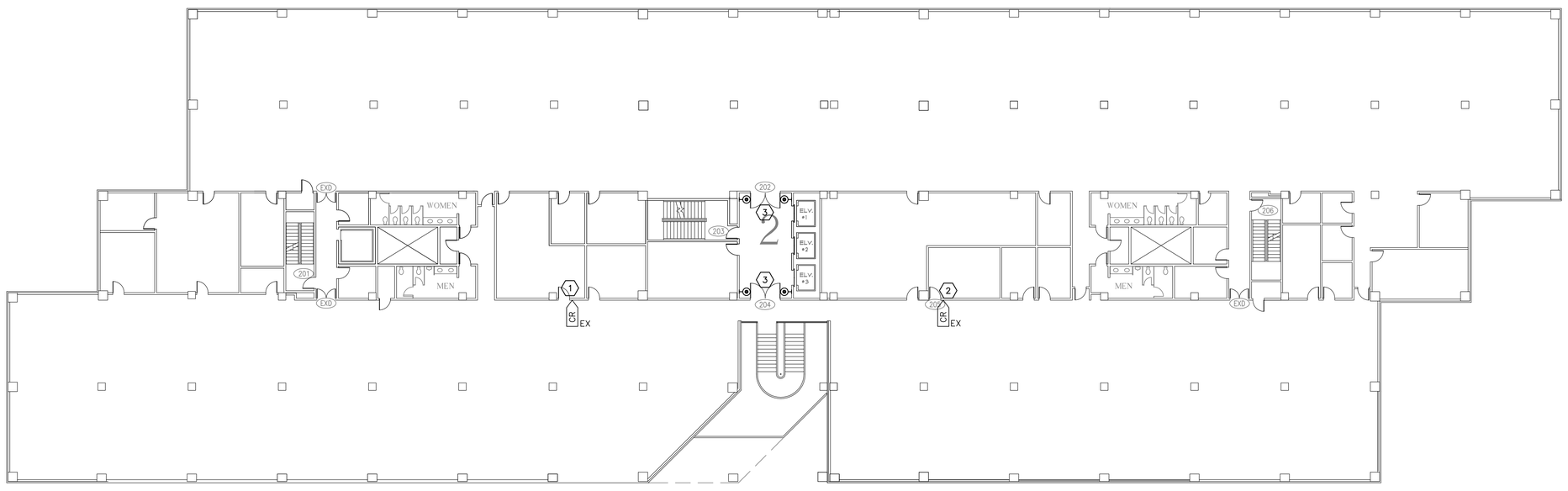
File Name: P:\2013\20130233\1Drawings\3Sheet\33EY101.dwg Last Plotted: 2013/10/01 @ 10:24 AM By: dxh

GENERAL SHEET NOTES

1. PROVIDE ACCESS CONTROL SYSTEM WORK AS INDICATED. PROVIDE EXPANSION OF EXISTING S2 SYSTEM CONTROLLERS AS REQUIRED FOR NEW CARD READER DOORS INDICATED A/R.
2. ALL EXISTING DOORS HAVE RECENTLY UPGRADED CABLE WITH 10 FT. COILED ABOVE DOOR. PROVIDE NEW CABLING AT NEW ACCESS CONTROL DOORS TO MATCH EXISTING.
3. PROVIDE ADDITIONAL ACCESS DOOR DEVICES AS INDICATED AND CONNECT TO EXISTING WIRE PAIRS AND PROVIDE WIRING CONNECTION TO NEW LOCKING AND RELEASE HARDWARE AS INDICATED.
4. PROVIDE NEW END OF LINE RESISTOR AT EACH NEW AND EXISTING ACCESS CONTROL DOOR DOOR POSITION SWITCH, AND REQUEST TO EXIST SWITCH. PROGRAM AND TEST EACH DOOR FOR OPEN AND SHORT-CIRCUIT SUPERVISION.
5. WIRE AND PROGRAM EACH EXISTING ACCESS CONTROL DOOR TO INDICATE FORCED OPEN CONDITIONS IN WHICH A DOOR IS OPENED WITHOUT A PROCEEDING AUTHORIZED CARD READ OR EXIT REQUEST SIGNAL.
6. PROVIDE WIRING, POWER, AND PROGRAMING OF EXISTING FIRE ALARM SYSTEM FOR NEW HELD-OPEN DOOR CLOSERS INDICATED.

⬡SHEET KEYNOTES

1. PROVIDE EXIT MOTION DETECTOR AND DOOR POSITION SWITCH AT INDICATED ELECTRIC STRIKE ACCESS CONTROL DOOR.
2. PROVIDE NEW DOOR POSITION SWITCH AND WIRING CONNECTION TO NEW LOCKING HARDWARE AT INDICATED ACCESS CONTROL DOOR. REFER TO CARD ACCESS DOOR TYPE #1 FOR REQUIREMENTS.
3. PROVIDE FIRE ALARM POWER, WIRING, AND DEVICES FOR CONTROL OF NEW HELD OPEN DOOR CLOSER DEVICES AT INDICATED DOOR.



NORTH

LEVEL TWO SECURITY PLAN

SCALE: 1/16" = 1'-0"

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

http://dfcm.utah.gov

DFCM STAMP

BUILDING NAME:

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33EY102
DRAWN BY: RXR
CHK'D BY: RPN
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SHEET TITLE

LEVEL TWO SECURITY PLAN

SHEET NUMBER

EY102

SHEET 13 OF 19

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

File Name: P:\2013\20130233\1Drawings\3Sheet\33EY102.dwg Last Plotted: 2013/09/16 @ 6:00 PM By: sjt

GENERAL SHEET NOTES

1. PROVIDE ACCESS CONTROL SYSTEM WORK AS INDICATED. PROVIDE EXPANSION OF EXISTING S2 SYSTEM CONTROLLERS AS REQUIRED FOR NEW CARD READER DOORS INDICATED A/R.
2. ALL EXISTING DOORS HAVE RECENTLY UPGRADED CABLE WITH 10 FT. COILED ABOVE DOOR. PROVIDE NEW CABLING AT NEW ACCESS CONTROL DOORS TO MATCH EXISTING.
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6. PROVIDE WIRING, POWER, AND PROGRAMING OF EXISTING FIRE ALARM SYSTEM FOR NEW HELD-OPEN DOOR CLOSERS INDICATED.

⬡SHEET KEYNOTES

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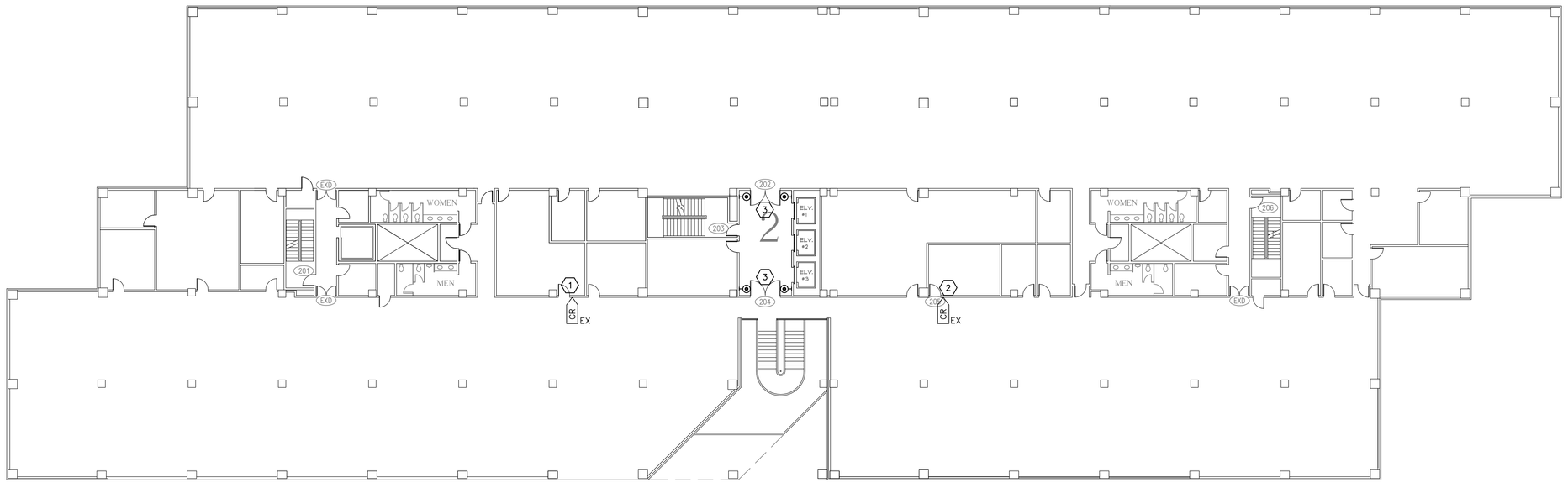

LEVEL TWO SECURITY PLAN
SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services

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4110 State Office Building
Salt Lake City, Utah 84114
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REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33EY102
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SHEET TITLE

LEVEL TWO SECURITY PLAN

SHEET NUMBER

EY102

SHEET 13 OF 19

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GENERAL SHEET NOTES

1. PROVIDE ACCESS CONTROL SYSTEM WORK AS INDICATED. PROVIDE EXPANSION OF EXISTING S2 SYSTEM CONTROLLERS AS REQUIRED FOR NEW CARD READER DOORS INDICATED A/R.
2. ALL EXISTING DOORS HAVE RECENTLY UPGRADED CABLE WITH 10 FT. COILED ABOVE DOOR. PROVIDE NEW CABLING AT NEW ACCESS CONTROL DOORS TO MATCH EXISTING.
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⬡SHEET KEYNOTES

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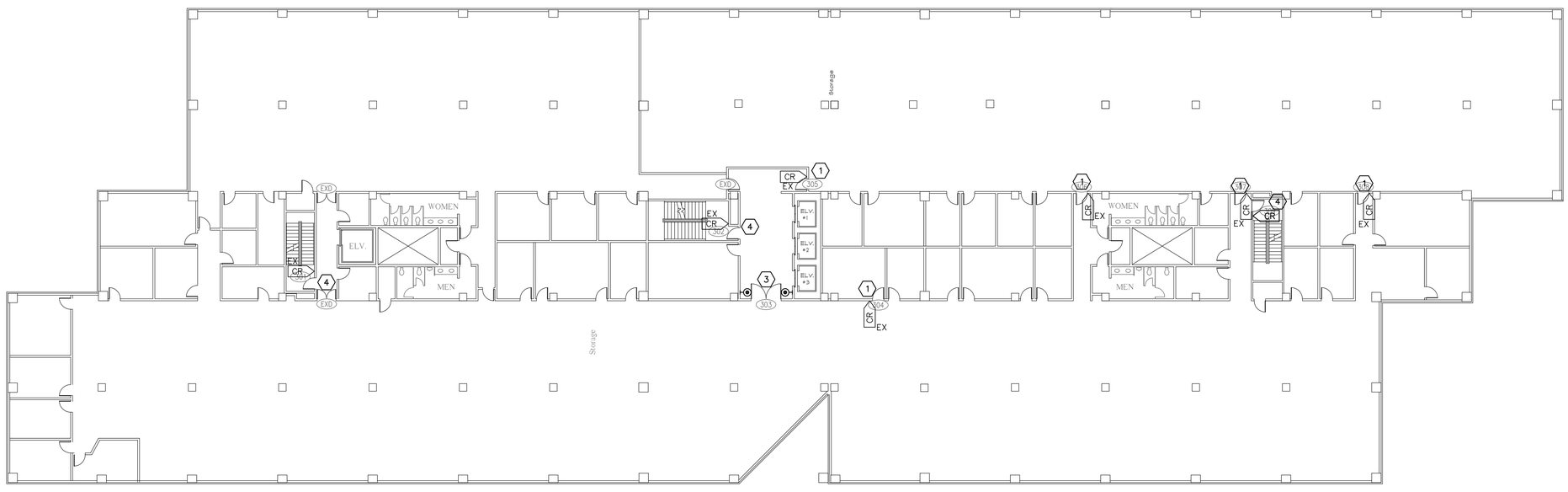
3. PROVIDE FIRE ALARM POWER, WIRING, AND DEVICES FOR CONTROL OF NEW HELD OPEN DOOR CLOSER DEVICES AT INDICATED DOOR.
4. PROVIDE WIRING CONNECTION TO NEW EXIT HARDWARE WITH REQUEST TO EXIT SWITCH. PROVIDE NEW DOOR POSITION SWITCH.



LEVEL THREE SECURITY PLAN
SCALE: 1/16" = 1'-0"

State of Utah
Department of Administrative Services

Division of Facilities
Construction & Management
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Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267

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DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33EY103
DRAWN BY: RXR
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SHEET TITLE

LEVEL THREE SECURITY PLAN

SHEET NUMBER

EY103

SHEET 14 OF 19

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

File Name: P:\2013\20130233\1Drawings\3Sheet\33EY103.dwg Last Plotted: 2013/09/16 @ 6:00 PM By: sjt

GENERAL SHEET NOTES

1. PROVIDE ACCESS CONTROL SYSTEM WORK AS INDICATED. PROVIDE EXPANSION OF EXISTING S2 SYSTEM CONTROLLERS AS REQUIRED FOR NEW CARD READER DOORS INDICATED A/R.
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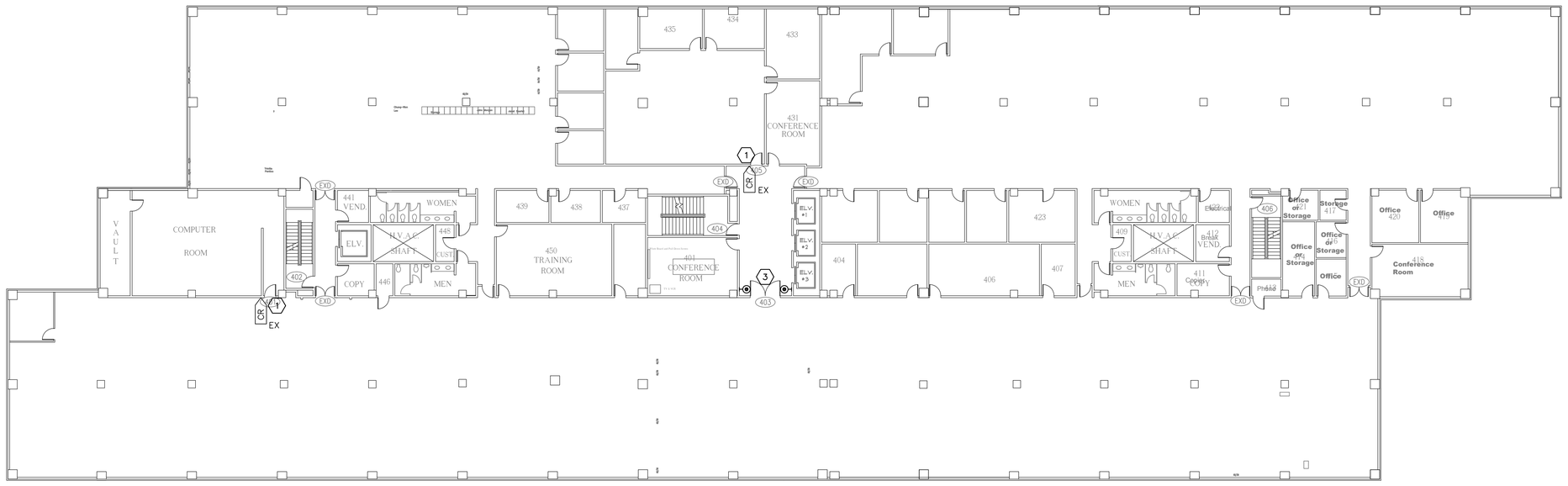

LEVEL FOUR SECURITY PLAN
SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

State of Utah
Department of Administrative Services
Division of Facilities Construction & Management
4110 State Office Building
Salt Lake City, Utah 84114
Phone: (801) 538 - 3018
Fax: (801) 538 - 3267
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DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
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SIGNATURE: FC
DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33EY104
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SHEET TITLE

LEVEL FOUR SECURITY PLAN

SHEET NUMBER

EY104

SHEET 15 OF 19

File Name: P:\2013\20130233\1Drawings\3Sheet\33EY104.dwg Last Plotted: 2013/09/16 @ 6:00 PM By: sjt

NORTH

PENTHOUSE SECURITY PLAN

SCALE: 1/16" = 1'-0"

TRACY STOCKING & ASSOCIATES

17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

5

File Name: P:\2013\20130233\1Drawings\3Sheet\33EY105.dwg Last Plotted: 2013/09/16 @ 6:00 PM By: dxh

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DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
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SIGNATURE: FC
DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33EY105
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SHEET TITLE

PENTHOUSE SECURITY PLAN

SHEET NUMBER

EY105

SHEET 16 OF 19

SECURITY EQUIPMENT LIST (TYPICAL)

SYMBOL	DESCRIPTION	MOUNTING *	ROUGH-IN	QTY	ACCEPTABLE TYPES
CR	CARD READER	40"	4SQ W/ 1G RING	OFP	SEE SECTION 281300
#1	CCTV CAMERA/ENCLOSURE TYPE, TYPICAL. REFER TO CCTV CAMERA/ENCLOSURE TYPE SCHEDULE.	SEE SCHEDULE	SEE SCHEDULE	OFP	SEE CCTV CAMERA/ENCLOSURE TYPE SCHEDULE AND SECTION 281300
VSS	I.P. VIDEO LAN PATCH, SWITCH, AND ENCLOSURE LOCATION (EXISTING)	N/A	EXISTING RACK	OFP	SEE SECTIONS 271500 & 282300
ACS	I.P. BASED CARD ACCESS CONTROLLER LOCATION (EXISTING)	N/A	4"x4" GUTTER & STUBS A/R	A/R	SEE SECTION 281300
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSER "TVSS"	AS NOTED	A/R	A/R	SEE SECTION 281300 AND 282300
#1	ELECTRIC LOCKING HARDWARE (SEE SCHEDULE)	EX.	EX.	OFP	
R	RELAY	ABOVE ACC CEILING	4SQ W/ 1G RING & COVER	OFP	SEE SECTION 281300
	CARD ACCESS DOOR CABLES. NUMBER IN PARENTHESES INDICATE QUANTITY.	AS NOTED	.75" C	OFP	
A(#)	ELECTRIC LOCK				BELDEN 8461, WEST PENN 224
	CARD READER(S)				BELDEN 9536 OR EQUIV.
	CONTACT INDICATOR				BELDEN 8442, WEST PENN 221
	EXIT MOTION DETECTOR				BELDEN 8444, WEST PENN 241
	AUX CABLE (WHEN INDICATED)				BELDEN 8461, WEST PENN 224
D(1)	CAT 6 I.P. VIDEO SURVEILLANCE CABLE NUMBER IN PARENTHESES INDICATE QUANTITY.	AS NOTED	.75" C	OFP	PROVIDE CABLES PER DFCM DTS AND OWATC WRITTEN REQUIREMENTS
(#)	MISC. CABLES. NUMBER IN PARENTHESES INDICATE QUANTITY.	AS NOTED	.75" C	OFP	AS NOTED AND PER MANUFACTURER'S WRITTEN INSTRUCTIONS

* COORDINATE MOUNTING HEIGHTS WITH ARCHITECTURAL ELEVATIONS BEFORE INSTALLATION.

SURVEILLANCE CAMERA/ENCLOSURE TYPE SCHEDULE (TYP)

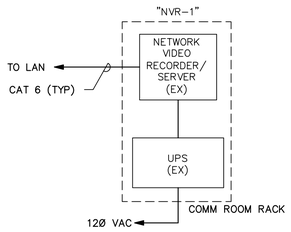
CAMERA TYPE NUMBER	SYMBOL	DESCRIPTION	PROVIDE
TYPE 1	#1	EXTERIOR 360° PANORAMIC I.P. CAMERA/ENCLOSURE, DOME (CORNER MOUNTED)	* 8 MEGAPIXEL CAMERA/ENCLOSURE * CAT 6 CABLE TO COMM ROOM LAN * MID-SPAN P.O.E. * BUILDING ENTRY SURGE PROTECTION

* OR PRE-APPROVED EQUIVALENT.

TYPICAL CARD ACCESS DOOR TYPE RACEWAY REQUIREMENTS*

DOOR TYPE #	SYMBOL	DESCRIPTION	PROTECTED SIDE ELEVATION	UNPROTECTED SIDE ELEVATION	LOCK TYPE(S)	INCLUDES:
TYPE 1:	CR, #1, CTR	SINGLE DOOR, 1 CARD READER, (FREE EGRESS)	DBL 4SQ J-BOX ABOVE ACC CEILING; EXIT MOTION 1G BOX; .75" C (TYP); CONTACT INDICATOR, 1G BOX IN FRAME	4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); CARD READER 4SQ BOX W/1G RING; 40"; ELECTRIC STRIKE 1G BOX IN FRAME	ELECTRIC STRIKE	* CARD READER (EXISTING) * EXIT MOTION DETECTOR * CONTACT INDICATOR * LOCK PWR (LOCK BY DOOR HDWR)
TYPE 2:	A#, CR, CTR	PAIR DOOR, 1 CARD READER, (SINGLE DIR EGRESS), AUTO-DOOR	PWR SUPPLY ABOVE ACC CEILING; DBL 4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); CONTACT INDICATORS 1G BOXES IN FRAME; TRANSFER HINGES 1G BOXES IN FRAME; (EGRESS SIDE); ELECTRIC PANIC HDWR	DBL 4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); CARD READER 4SQ. BOX W/1G RING; 40"	ELECTRIC PANIC HDWR	* CARD READER (EXISTING) * CONTACT INDICATORS * LOCK PWR (PWR SUPPLY & LOCKS BY DOOR HDWR) * TRANSFER HINGES (PWR TRANSFER HINGES BY DOOR HDWR) * ELEC PANIC HDWR (PANIC HDWR & PWR SUPPLY BY DOOR HDWR) * AUTO-DOOR RELAYS (REFER TO AUTO-DOOR ACCESS CONTROL DETAIL) * AUTO-DOOR ACTIVATION BY EXISTING CAR READER
TYPE 3:	CR, #3, CTR	SINGLE DOOR, 1 CARD READER, (FREE EGRESS)	PWR SUPPLY ABOVE ACC CEILING; DBL 4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); ELECTRIC EXIT HDWR; CONTACT INDICATOR, 1G BOX IN FRAME; TRANSFER HINGE 1G BOX IN FRAME	4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); CARD READER 4SQ BOX W/1G RING; 40"	ELECTRIC PANIC HDWR	* CARD READER (NEW) * EXIT MOTION DETECTOR * CONTACT INDICATOR * ELEC PANIC HDWR (BY DOOR HDWR * TRANS HINGE (BY DOOR HDWR) * LOCK PWR (LOCK AND PWR SUPPL BY DOOR HDWR)
TYPE 4:	CR, #4, CTR	PAIR DOOR, 1 CARD READER, (SINGLE DIR EGRESS)	PWR SUPPLY ABOVE ACC CEILING; DBL 4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); MAG LOCKS & CONTACT INDICATORS 1G BOXES IN FRAME; TRANSFER HINGE 1G BOX IN FRAME; (EGRESS SIDE); TRANSFER HINGE 1G BOX IN FRAME; SWITCHED EXIT HDWR	DBL 4SQ J-BOX ABOVE ACC CEILING; .75" C (TYP); CARD READER 4SQ BOX W/1G RING; 40"; (LOCKED SIDE)	MAG LOCKS WITH SWITCHED EXIT HARDWARE	* CARD READER (EXISTING) * EXIT MOTION DETECTOR * CONTACT INDICATORS * LOCK PWR (LOCK BY DOOR HDWR) * TRANSFER HINGE (PWR TRANSFER HINGE BY DOOR HDWR) * ELEC PANIC HDWR (PANIC HDWR BY DOOR HDWR) * AUTO-DOOR RELAYS (REFER TO AUTO-DOOR ACCESS CONTROL DETAIL) * AUTO-DOOR ACTIVATION BY EXISTING CARD READER

* FOR REFERENCE ONLY. SECURITY DOOR HARDWARE TO BE UPGRADED AS PART OF FUTURE PROJECT. TYPES SHOWN FOR POSSIBLE EXAMPLES OF YET TO BE DESIGNATED FUTURE DOOR HARDWARE.

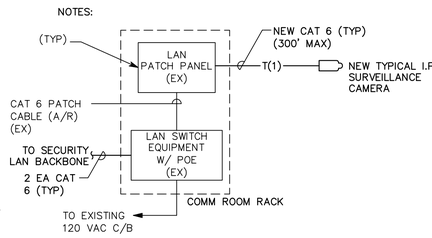


NOTES:

1. PROVIDE NETWORK VIDEO RECORDER/SERVER CAMERA LICENSES AS REQUIRED FOR NEW SURVEILLANCE SYSTEM EQUIPMENT. COORDINATE WITH CAMPUS LAN PERSONNEL.
2. PROVIDE PROGRAMMING OF EXISTING EXACQ VISION VIDEO MANAGEMENT SOFTWARE, INCLUDING ALL SET-UP SOFTWARE AND TRAIN SECURITY AND I.P. PERSONNEL IN ITS USE.
3. PROVIDE MANUFACTURER'S CERTIFIED TECHNICIAN FOR PROGRAMMING AND TESTING I.P. SURVEILLANCE SYSTEM AND FOR PERFORMANCE CERTIFICATION OF CATEGORY 6 HORIZONTAL AND BACKBONE CABLING ASSEMBLIES.

B1 I.P. SURVEILLANCE SYSTEM NETWORK VIDEO RECORDER/SERVER 1-LINE DIAGRAM

NTS



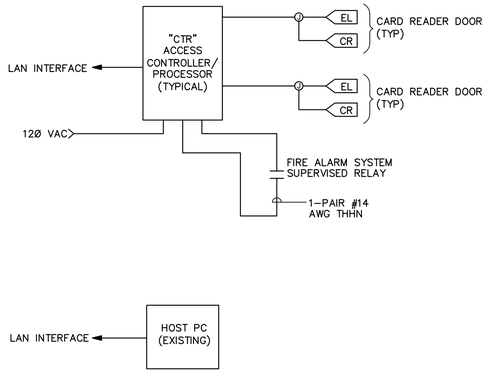
NOTES:

1. PROVIDE .75" C FROM EACH CAMERA . SUPPORT CABLES PER NEC TO ASSOCIATED BUILDINGS INDICATED COMM. ROOM RACK LOCATION.
2. UTILIZE EXISTING ETHERNET SWITCHES IN COMM ROOMS A/R FOR INDICATED CAMERAS.
3. COORDINATE ALL I.P. ADDRESSES AND EQUIPMENT ENCLOSURE SPACE FOR I.P. SURVEILLANCE EQUIPMENT WITH OWNER'S LAN PERSONNEL PRIOR TO COMMENCING WORK.
4. PROVIDE PLENUM CAT 6 CABLES FOR NEW CAMERAS & LAN SWITCHING EQUIPMENT. COMSCOPE SYSTEMAX (OR PRE-APPROVED EQUIVALENT) INSTALLED & TESTED BY MANUFACTURERS CERTIFIED PERSONNEL TO MEET ALL OF MANUFACTURERS WARRANTEE REQUIREMENTS. ACQUIRE SAID WARRANTEE ON ALL NEW CABLES.

A1 I.P. SURVEILLANCE SYSTEM SINGLE LINE DIAGRAM (TYPICAL)

NTS

1. ACCESS CONTROL SYSTEM BASED UPON 2 CARD READERS PER LAN BASED ACCESS CONTROLLER/PROCESSOR. PROVIDE A/R. REFER TO SECTION 281300 FOR ADDITIONAL REQUIREMENTS. PROVIDE AS REQUIRED.
2. REQUEST TO EXIT AND DOOR CONTACT INDICATOR CIRCUITS SHALL BE SUPERVISED FOR OPEN CIRCUIT OR SHORT CIRCUIT FAULTS BETWEEN THE DEVICE CONTACTS AND ACCESS CONTROLLER.
3. CONNECT TO FIRE ALARM RELAYS AS REQUIRED TO LOCK POWER SUPPLIES AS REQUIRED TO UNLOCK DOORS AS INDICATED UPON FIRE ALARM.
4. EXIT MOTION DETECTOR SHALL NOT INITIATE DOOR UNLOCKING, BUT RATHER IT SHALL DETECT EXITING USERS JUST BEFORE OPERATING EXIT HARDWARE AND SIGNAL SYSTEM. CONTACT INDICATOR SIGNAL SHALL PROMPT SYSTEM FORCED OPEN ALARM IF NOT IMMEDIATELY PROCEEDED BY EXIT MOTION DETECTOR SIGNAL.
5. PROVIDE 1" CND FROM CARD ACCESS DOOR J-BOX TO COMM ROOM.
6. PROVIDE LOCKABLE METAL ENCLOSURES FOR ALL NEW ACCESS CONTROLLERS A/R IN COMM ROOMS INDICATED.



A3 CARD ACCESS SYSTEM SINGLE LINE DIAGRAM (TYP)

NTS

State of Utah
Department of Administrative Services
Division of Facilities Construction & Management
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http://dfcm.utah.gov

DFCM STAMP

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
REVIEWED FOR CODE COMPLIANCE
SIGNATURE: FC
DATE: 10-9-13

Cannon Health Building
288 North 1460 West
Salt Lake City, Utah

PROJECT TITLE:

UPGRADE FIRE RATED CORRIDOR DOORS

LICENSED PROFESSIONAL ENGINEER
No. 5048805
RUSSELL PAUL NAEGLE
STATE OF UTAH
9-16-13

MARK	DATE	DESCRIPTION

ISSUE TYPE:

ISSUE DATE: 9-13-2013

DFCM PROJECT NO: 12188390
CAD PROJECT NO: 20130233RN
CAD DWG FILE: 33EY601
DRAWN BY: RXR
CHK'D BY: RPN
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SHEET TITLE

SECURITY SURVEILLANCE DIAGRAMS & SCHEDULES

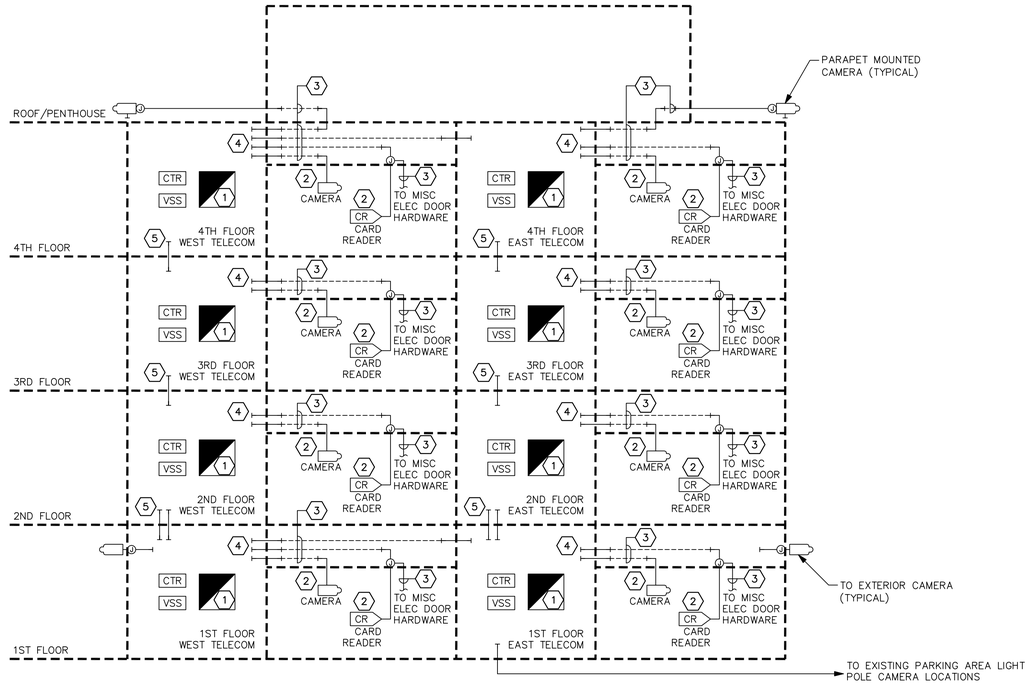
SHEET NUMBER

EY601

SHEET 17 OF 19

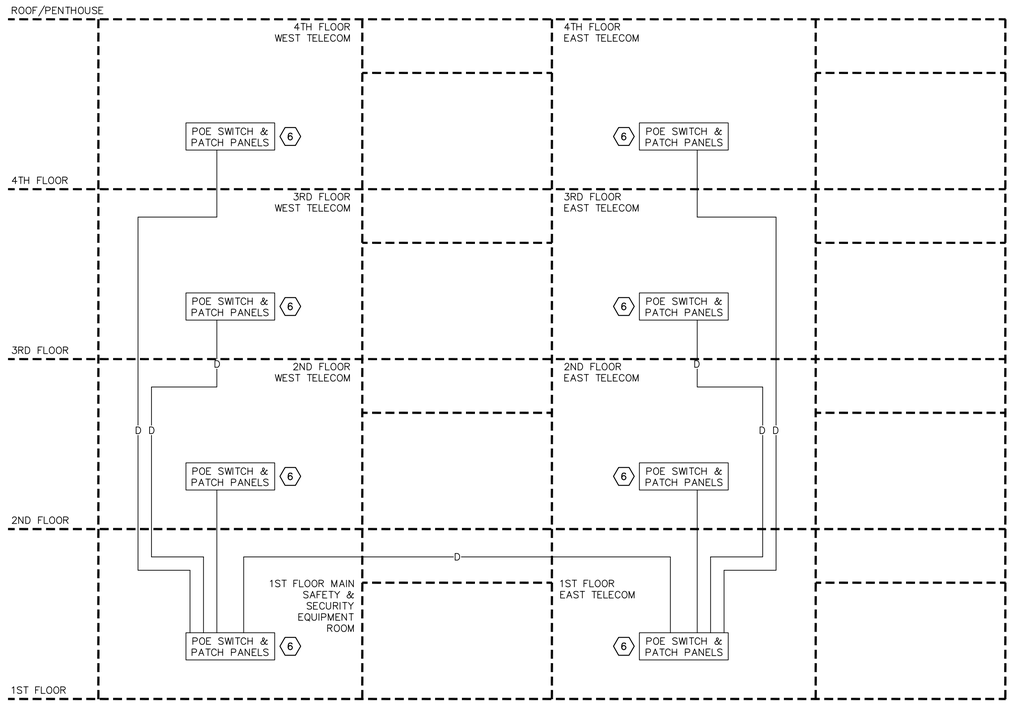
TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

File Name: P:\2013\20130233\1Drawings\3Sheet\33EY601.dwg Last Plotted: 2013/09/16 @ 5:59 PM By: sjt



C2 EXISTING SECURITY LAN RACEWAY RISER DIAGRAM

NTS



A2 EXISTING SECURITY LAN BACKBONE CABLING RISER DIAGRAM

NTS

GENERAL SHEET NOTES

1. WELL IN ADVANCE OF INSTALLATION, COORDINATE WORK WITH ALL OTHER TRADES SO THAT ELECTRICAL EQUIPMENT, OR ITS INTENDED USE, IS NOT OBSTRUCTED BY EQUIPMENT FROM OTHER DIVISIONS.
2. ALL SECURITY SYSTEM CABLING IS TO BE INSTALLED INSIDE MINIMUM 1" CONDUIT. STUB CONDUIT FROM JUNCTION BOX LOCATION TO CABLE LOCATION TO CABLE MANAGEMENT SYSTEM SPECIFIED FOR ACCESSIBLE CEILING.
3. SECURITY ROUGH-IN CONDUIT SHALL COMPLY WITH ANSI/TIA/EIA 569-B WHICH INCLUDES, BUT IS NOT LIMITED TO, THE REQUIREMENT THAT EACH CONDUIT RUN SHALL HAVE NO MORE THAN 2 EACH 90 DEGREE BENDS OR EXCEED 100'-0" IN LENGTH WITHOUT A PULL BOX.
4. COMPLY WITH ALL DFCM CABLING STANDARDS.

SHEET KEYNOTES

1. UTILIZE EXISTING THICK FIRE-TREATED AC GRADE PLYWOOD OF WIDTH AND HEIGHT A/R FOR SECURITY LAN EQUIPMENT AND TERMINATIN HARDWARE CABINET ENCLOSURE AND ACCESS CONTROL PANELS REQUIRED AT INDICATED LOCATIONS. COORDINATE EXACT LOCATIOI WITH OWNER PRIOR TO CONSTRUCTION.
2. PROVIDE DEEP 4-11/16" JUNCTION BOX WITH SINGLE GANG MUD RING AND COVER PLATE FOR NEW DEVICES INDICATED ON PLANS.
3. PROVIDE LISTED CABLING J-HOOK SUPPORTS ABOVE ACCESSIBLE CEILING EVERY 5'-0" ALONG ALL CABLE PATHS WITH CABLING SUPPORTED MINIMUM 3" ABOVE ACCESSIBLE CEILING. PROVIDE 1" MINIMUM CONDUIT FOR UP TO 4 CATEGORY 5 CABLES ABOVE INACCESSIBLE CEILINGS.
4. UTILIZE EXISTING CONDUIT SLEEVES STUBBED TO ACCESSIBLE CEIL SPACE A/R FOR ACCESS CONTROL AND VIDEO SURVEILLANCE CABLING INDICATED. LIMIT CABLE FILL PER NEC. FIRESTOP AFTER CABLING INSTALLATION COMPLETE.
5. UTILIZE EXISTING CONDUIT SLEEVES BETWEEN FLOORS. LIMIT CABLE FILL PER NEC. FIRESTOP AFTER CABLING INSTALLATION COMPLETE.
6. UTILIZE EXISTING SPARE ETHERNET SWITCH PORTS WITH POE, PATCH PANEL TERMINATING, HARDWARE (SIZE A/R, 24-PORT MINIMUM), CABLING MANAGEMENT HARDWARE, VERTICAL POWER MANAGEMENT STRIP. BOND EQUIPMENT AND CABINET TO NEAREST ELECTRICAL PANEL GROUND BUS AND TO NEAREST TELECOMMUNICATIONS GROUNDING BUSBAR OR STRUCTURAL METAL WITH SOLID #6 AWG GREEN SHEATH CABLE MINIMUM.

State of Utah
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DFCM PROJECT NO: 12188390
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SHEET TITLE

SECURITY SYSTEM DIAGRAMS

SHEET NUMBER

EY602

SHEET 18 OF 19

TRACY STOCKING & ASSOCIATES
17 Exchange Place, SLC, Utah 84111 Phone: 801-463-7108

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CANNON HEALTH BUILDING
288 North 1460 West SLC, UT

UPGRADE FIRE RATED CORRIDOR DOORS
PROJECT #12188390

State of Utah
Division of Facilities Construction & Management

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SECTION 01 1100

SUMMARY OF WORK

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.

B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

1.2 WORK BY OWNER

A. Owner will furnish and install some portions of The Work with its own forces. Contractor will be provided with schedule of when these items are to be performed.
   1. General:
      a. Complete work necessary to accommodate work to be performed by Owner before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work.
      b. Store and protect completed work provided by Owner until date of Substantial Completion.

END OF SECTION

B L A N K PA G E

SECTION 01 1200

MULTIPLE CONTRACT SUMMARY

1.1 SUMMARY OF CONTRACTS

A. Owner may issue separate contracts for operations scheduled to precede and be substantially completed before beginning of The Work under this Contract.
   1. Contractor will be given written notice from such contractors of any revisions to scheduled completion of their work at least 10 days in advance.

B. Owner has issued or will issue separate contracts for operations scheduled to be completed prior to Notice to Proceed and Substantial Completion,
   1. General:
      a. Schedule performance of work covered by such separate contracts in Contractor's Construction Schedule so as to avoid delays in Substantial Completion. Give written notice to such contractors and to Owner of any revisions to scheduled delivery and work dates at least 10 days in advance.
      b. Complete work necessary to accommodate items provided under such separate contracts before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work including, but not limited to, cost of crews during downtime or for call backs and costs to correct substrate deficiencies.
      c. Store and protect completed work provided under separate contracts until date of Substantial Completion.
   2. Testing and Inspection. See Section 01 4523 “Testing and Inspection” for testing and inspection, and testing laboratory services for materials, products, and construction methods:
      a. Aggregate Base. See Section 31 1123.
      b. Concrete. See Section 03 3111.
      c. Concrete Moisture Vapor Emission and Alkalinity level. See Section 09 0503, Section 09 6813.
      d. Fill / Engineering Fill. See Section 31 2323.

END OF SECTION

B L A N K PA G E

SECTION 01 1400

WORK RESTRICTIONS

1.1 PROJECT CONDITIONS

A. During construction period, Contractor will have use of a limited portion of the premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:
   1. Comply with all work restriction required by the Owner.
   2. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
   3. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project site.
   4. Do not allow use of tobacco in any form on Project Site.
   5. Do not allow pornographic or other indecent materials on site.
   6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
   7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
   8. Do not allow playing of obnoxious and loud music on Project Site.
   9. Do not build fires on Project Site.
   10. Do not allow weapons on Project Site, except those carried by law enforcement officers or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

B. Existing Facilities:
   1. Reasonably accommodate use of existing facilities by Owner.

C. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed structural engineer engaged by Contractor, subject to the review by Architect.

END OF SECTION

B L A N K P A G E

SECTION 01 2600

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to this section.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections: The following sections contain requirements that relate to this section:
   1. Division 1 Section “Submittal Procedures” for requirements for the Contractor’s Construction Schedule.
   2. Division 1 Section “Payment Procedures” for administrative procedures governing applications for payment.

1.3 MINOR CHANGES IN THE WORK

A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment of the Contract Sum or Contract Time, will be issued by the Architect.

1.4 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Proposal changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect, with detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
   1. Proposal requests issued by the Architect are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.
   2. Unless otherwise indicated in the proposal request, within 15 days of receipt of the proposal request, submit to the Architect for the Owner’s review an estimate of cost necessary to execute the proposed change.
      a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor-Initiated Change Order Proposal Request: When latent or other unforseen conditions require modifications on the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
   1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
   2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Comply with requirements in Section “Products and Substitutions” if proposed change in the Work requires the substitution of one product or system for a product or system not specified.

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect may issue a Construction Change Directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusions in a Change Order.
   1. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determined change in the Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.6 CHANGE ORDER PROCEDURES

A. Upon the Owner’s approval of a Change Order Proposal Request, the Architect will issue a Change Order for signatures of the Owner and Contractor as provided in the Conditions of the Contract.

PART 2 - PRODUCTS
Not Applicable

PART 3 – EXECUTION
Not Applicable

END OF SECTION

SECTION 01 2900

PAYMENT PROCEDURES

1.1 PAYMENT REQUESTS

A. Use current AIA Application for Payment form with Schedule of Values for Payment Requests.

B. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.

C. Request Preparation:
   1. Complete every entry on Payment Request form.
   2. Entries will match data on approved schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
   3. Submit signed Payment Request to Architect with current Construction Schedule.

D. Provide following submittals before or with submittal of Initial Payment Request:
   1. List of Subcontractors.
   2. Initial progress report.
   3. Contractor's Construction Schedule.
   4. Submittal Schedule.

E. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

1.2 SCHEDULE OF VALUES

A. Submit schedule of values on Owner's standard form to Architect 20 days minimum before submission of Initial Payment Request as a necessary condition before payment will be processed. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
   1. Contractor's Construction Schedule.
   2. Payment Request form.
   3. Schedule of Allowances.
   4. Schedule of Alternates.

END OF SECTION

B L A N K PA G E

SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

1.1 PROJECT COORDINATION

A. Project designation for this Project is **Cannon Health Upgrade Fire Rated Corridor Doors**

B. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

1.2 MULTIPLE CONTRACT COORDINATION

A. Contractor shall be responsible for accurately maintaining and reporting schedule of The Work from Notice to Proceed to date of Substantial Completion.

B. Contractor shall be responsible for providing Temporary Facilities And Controls for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

C. Contractor shall be responsible for providing Construction Waste Management And Disposal services for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

D. Contractor shall be responsible for Final Cleaning for entire Project.

1.3 PROJECT MEETINGS AND CONFERENCES

A. Preconstruction Conference:
   1. Attend preconstruction conference and organizational meeting scheduled by Architect at Project site or other convenient location.
   2. Be prepared to discuss items of significance that could affect progress, including such topics as:
      a. Status of permits.
      b. Construction schedule.
      c. Critical Work sequencing.
      d. Designation of responsible personnel.
      e. Procedures for processing interpretations and Modifications.
      f. Procedures for processing Payment Requests.
      g. Distribution of Contract Documents.
      h. Submittal of Product Data, Shop Drawings, Samples, Quality Assurance / Control submittals.
      i. Preparation of record documents and O & M manuals.
      j. Use of the premises.
      k. Office, work, and storage areas.
      l. Equipment deliveries and priorities.
      m. Security.
      n. Project cleanup.
      o. Working hours.
      p. Current problems.
      q. General schedule of inspections by Architect and its consultants.
      r. General inspection of tests.
   3. Architect will record minutes of meetings and distribute copies to Owner and Contractor within three working days.

B. Progress Meetings:
   1. Attend progress meetings at Project site at regularly scheduled intervals determined by Architect, at least once a week.

2. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.
3. Be prepared to discuss items of significance that could affect progress, including following:
   a. Progress since last meeting.
   b. Whether Contractor is on schedule.
   c. Activities required to complete Project within Contract Time.
   d. Labor and materials provided under separate contracts.
   e. Off-site fabrication problems.
   f. Access.
   g. Site use.
   h. Temporary facilities and services.
   i. Hours of work.
   j. Hazards and risks.
   k. Project cleanup.
   l. Quality and Work standards.
   m. Status of pending modifications.
   n. Documentation of information for Payment Requests.
   o. Maintenance of Project records.
4. Architect will prepare minutes of progress meetings and distribute copies of minutes to Owner and Contractor within three working days.

C. Pre-Installation Conferences:
1. Attend pre-installation conferences specified in Contract Document.
   a. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
   b. Request input from attendees in preparing agenda.
2. Be prepared to discuss following items:
   a. Requirements of Contract Documents.
   b. Completed work necessary for installation of items or systems.
   c. Conditions not in compliance with installation requirements.
   d. Installation and inspection schedule.
   e. Coordination between trades.
   f. Space and access limitations.
   g. Testing.
3. Architect will prepare meeting minutes and distribute minutes to Owner and Contractor within three working days.

END OF SECTION

SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

1.1 SCHEDULING OF WORK

A. Bar Chart Schedule:
   1. Submit horizontal bar chart schedule before Preconstruction Conference. Provide separate time bar for each construction activity listed on Owner's payment request form. Within each time bar, show estimated completion percentage. Provide continuous vertical line to identify first working day of each week. Show each activity in chronological sequence. Show graphically sequences necessary for completion of related portions of The Work. As The Work progresses, place contrasting mark in each bar to indicate actual completion.
   2. Provide copies of schedule for Architect and Owner and post copy in field office.
   3. Revise schedule weekly. Send copy of revised schedule to Owner and Architect and post copy in field office.

B. Daily Construction Reports:
   1. Prepare daily reports of operations at Project including at least following information:
      a. List of Subcontractors at site.
      b. Approximate count of personnel at site by trade.
      c. High and low temperatures, general weather conditions.
      d. Major items of equipment on site.
      e. Materials, equipment, or Owner-furnished items arriving at or leaving site.
      f. Accidents and unusual events.
      g. Site or structure damage by water, frost, wind, or other causes.
      h. Meetings, conferences, and significant decisions.
      i. Visitors to the job including meeting attendees.
      j. Stoppages, delays, shortages, losses.
      k. Any tests made and their result if known.
      l. Meter readings and similar recordings.
      m. Emergency procedures.
      n. Orders and requests of governing authorities.
      o. Modifications received, carried out.
      p. Services connected, disconnected.
      q. Equipment or system tests and start-ups.
      r. Brief summary of work accomplished that day.
      s. Signature of person preparing report.
   2. Submit daily reports to Architect at least weekly.
   3. Maintain copies of daily reports at field office.

END OF SECTION

B L A N K P A G E

SECTION 01 3300

SUBMITTAL PROCEDURES

1.1 GENERAL

A. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals required for related elements of The Work so processing will not be delayed by need to review submittals concurrently for coordination. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
   3. Allow sufficient review time so installation will not be delayed by time required to process submittals, including time for resubmittals.
      a. Allow 21 days for initial review. Allow additional time if processing must be delayed to allow coordination with subsequent submittals. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.
      b. If an intermediate submittal is necessary, process same as initial submittal.
      c. Allow 10 days for reprocessing each submittal.
      d. No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.
   4. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
      a. Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
      b. Include following information on label for processing and recording action taken:
         1) Project name.
         2) Date.
         3) Name and address of Architect.
         4) Name and address of Contractor.
         5) Name and address of Subcontractor.
         6) Name and address of supplier.
         7) Name of manufacturer.
         8) Number and title of appropriate Specification Section.
         9) Drawing number and detail references, as appropriate.
   5. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using transmittal letter. On transmittal, record relevant information and requests for data. Include Contractor's certification that information complies with Contract Document requirements, or, on form or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations.
   6. Submittals received from sources other than Contractor or not marked with Contractor's approval will be returned without action.

1.2 SUBMITTAL SCHEDULE

A. No requirements

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Submit Product Data, as required by individual Sections of Specifications.

2. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
3. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
4. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
5. Electronic (PDF) submittals are preferred.

B. Shop Drawings:
1. Submit newly prepared graphic data to accurate scale. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches. Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
   a. Dimensions.
   b. Identification of products and materials included.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard printed information prepared without specific reference to Project is not acceptable as Shop Drawings.
3. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

C. Samples:
1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
   a. Mount, display, or package Samples so as to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
      1) Generic description of Sample.
      2) Sample source.
      3) Product name or name of manufacturer.
      4) Compliance with recognized standards.
      5) Availability and delivery time.
   b. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
      1) Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
      2) Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
      3) Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
   c. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
   d. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.

e. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
   1) Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
   2) Sample sets may be used to obtain final acceptance of construction associated with each set.

1.4 INFORMATIONAL SUBMITTALS

A. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations. Submit five copies to Architect immediately upon receipt.

END OF SECTION

B L A N K P A G E

SECTION 01 3500

SPECIAL PROCEDURES

1.1 ACCELERATION OF WORK

A. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.

B. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

1.2 OWNER'S SAFETY REQUIREMENTS

A. Personal Protection:
   1. Contractor shall ensure:
      a. Positive means of fall protection, such as guardrails system, safety net system, personal fall arrest system, etc, is provided to employees whenever exposed to a fall six feet or more above a lower level.
      b. Personnel working on Project shall wear hard hats and safety glasses as required by regulation and hazard.
      c. Personnel working on Project shall wear long or short sleeve shirts, long pants, and hard-toed boots or other sturdy shoes appropriate to type and phase of work being performed.

B. Contractor Tools And Equipment:
   1. Contractor shall ensure:
      a. Tools and equipment are in good working condition, well maintained, and have necessary guards in place.
      b. Ground Fault Circuit Interrupters (GFCI) is utilized on power cords and tools.
      c. Scaffolding and man lifts are in good working condition, erected and maintained as required by governmental regulations.
      d. Ladders are in good condition, well maintained, used as specified by Manufacturer, and secured as required.

C. Miscellaneous:
   1. Contractor shall ensure:
      a. Protection is provided on protruding rebar and other similar objects.
      b. General Contractor Superintendent has completed the OSHA 10-hour construction outreach training course or equivalent.
      c. Implementation and administration of safety program on Project.
      d. Material Safety Data Sheets (MSDS) are provided for substances or materials for which an MSDS is required by governmental regulations before bringing on site.
      e. Consistent safety training is provided to employees on Project.
   2. Report accidents involving injury to employees on Project that require off-site medical treatment to Owner's designated representative.

1.3 ENVIRONMENTAL PROCEDURES

A. Asbestos:

1. For demolition activities where allowable Asbestos Containing Material (ACM) is to be left in place, or where Contractor is allowed to remove Category I Non-friable ACM, the following requirements apply:
   a. Prepare and submit notifications and permit applications required by law or by Owner.
   b. Comply with regulations found in 40 Code of Federal Regulations, Part 61 - National Emission Standards for Hazardous Air Pollutants, Subpart M - National Emission Standard for Asbestos, paragraph 61.145 - Standard for demolition and renovation.
   c. Comply with local and State regulations regarding asbestos removal and demolition of structures.
   d. Comply with regulations found in 29 CFR 1926.1101 - OSHA Asbestos Standard for Construction.
      1) Conduct required exposure assessments and monitoring.
      2) Ensure that a 'Competent Person' supervises abatement work.
      3) Provide required employer information, training, and personal protective equipment.
      4) Demolition activities involving non-friable ACM is considered ‘Unclassified Asbestos Work.’ However, be responsible for using wet methods and controlling emissions that may contain ACM fibers, if necessary.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
   1. Specific quality assurance and quality control requirements for individual construction activities are specified in Sections that specify those activities and Section 01 4523. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
   3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:
   1. Section 01 3100: 'Project Management and Coordination' for Pre-Installation Conferences for testing and inspection.
   2. Section 01 3200: 'Construction Progress Documentation' for developing a schedule of required tests and inspections.
   3. Section 01 3300: 'Submittal Procedures'.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 7300: 'Execution' for cutting and patching for repair and restoration of construction disturbed by testing and inspecting activities.
   7. Divisions 01 thru 49 establish responsibility for providing specific testing and inspections.

1.3 REFERENCES

A. Association Publications:
   1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
   2. International Code Council (IBC):
      a. IBC Chapter 17, 'Structural Tests and Special Inspections'.
   3. The American Institute of Architects. AIA Document A201, *General Conditions of the Contract for Construction*. Washington, DC. 2007.
   4. The Construction Specifications Institute. Project Resource Manual/CSI Manual of Practice, 5th *Edition*. New York, McGraw-Hill, 2005.

B. Definitions:
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Approved: To authorize, endorse, validate, confirm, or agree to.
3. Contract Documents: Engineering and Architectural Drawings and Specifications issued for construction, plus clarification drawings, addenda, approved change orders and contractor designed elements.
4. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with requirements indicated; and having complied with requirements of authorities having jurisdiction.
5. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
6. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
    a. Inspection: Not required by code provisions but may be required by Contract Documents.
    b. Special Inspection: Required by code provisions and by Contract Documents.
    c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
    d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
7. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
    a. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.
8. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish standard by which the Work will be judged.
9. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
10. Owner’s Representative: Owner’s Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner’s approval or authorization.
11. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
12. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
13. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
14. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
15. Service Provider: Agency or firm qualified to perform required tests and inspections.
16. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
17. Special Inspection: See Inspection.

18. Special Inspector: Certified individual or firm that implements special inspection program for project.
19. Special Test: See Test.
20. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
    a. Test: Not required by code provisions but may be required by Contract Documents.
    b. Special Test: Required by code provisions and by Contract Documents.
21. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
22. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
23. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: Quantity or quality level shown or specified shall be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements. Refer uncertainties to Architect for decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: Testing Agency to demonstrate their capabilities and experience per Article 1.7 “Quality Assurance”.

B. Schedule of Tests and Inspections: Prepare in tabular form and include following:
   1. Specification Section number and title.
   2. Description of test and inspection.
   3. Identification of applicable standards.
   4. Identification of test and inspection methods.
   5. Number of tests and inspections required.
   6. Time schedule or time span for tests and inspections.
   7. Entity responsible for performing tests and inspections.
   8. Requirements for obtaining samples.

C. Certified written reports of each inspection, test, or similar service will include, but not be limited:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of Testing Agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.

12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

1.6 QUALITY ASSURANCE

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Activities performed by Owner's Quality Assurance Testing Agency include, but are not limited to following:
   1. Preconstruction:
      a. Review inspection requirements.
      b. Review inspection frequency.
      c. Review concrete mix design submittals.
      d. Review other material submittals.
      e. Review contractor's welding certificates.
      f. Prepare non-compliance log to track non-compliant testing or inspections.
      g. Review Quality Assurance personnel qualifications.
   2. Excavation Support and Protection:
      a. Anchor tie-back System:
         1) Observe and record proof tests.
      b. Soil Nail Systems:
         1) Observe and record proof tests.
         2) Observe drilling for changes in soil type, hole diameter, length, and cleanliness.
         3) Periodically observe placement of drainage materials, reinforcing, and shotcrete.
         4) Review compressive strength test results of grout and shotcrete.
   3. Fill / Engineered Fill, Aggregate Base:
      a. Review Quality Assurance coverage of earthwork required observation and testing.
      b. Provide periodic Quality Assurance testing to confirm accuracy of Quality Assurance test reports.
      c. Review Quality Assurance testing and observation reports.
      d. Review Quality Assurance personnel qualifications.
   4. Reinforced Concrete:
      a. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
      b. Obtaining trade sign-offs on each pour card will be responsibility of General Contactor's foreman or whoever is in charge of ordering concrete.
      c. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
      d. Verify Quality Assurance coverage of reinforced concrete testing or inspections.
      e. Provide periodic Quality Assurance testing or inspections of concrete elements.
      f. Review Quality Assurance reports from previous day.
      g. Review laboratory test results.
      h. Obtain Contractor placement schedules.
      i. Review Quality Assurance personnel qualifications.
   5. Structural Masonry Units, Reinforcing, Mortar, and Grout:
      a. Review inspection requirements.
      b. Review inspection frequency.
      c. Review masonry design material submittals.
      d. Review other material submittals.
      e. Prepare non-compliance log to track non-compliant testing or inspections.
      f. Review Quality Assurance personnel qualifications.
   6. Steel:
      a. Review inspection requirements.
      b. Review inspection frequency.
      c. Review contractor's welding certificates.

d. Prepare non-compliance log to track non-compliant testing or inspections.
e. Review Quality Assurance personnel qualifications.

7. Asphalt Paving:
   a. Review inspection requirements.
   b. Review inspection frequency.
   c. Review design material submittals.
   d. Prepare non-compliance log to track non-compliant testing or inspections.
   e. Review Quality Assurance personnel qualifications.
8. Weekly Activities:
   a. Summarize and track any non-compliance issues.
   b. Provide summary report of previous week's performed Work.
   c. Visit contractors periodically to find out if they have any concerns with Quality Assurance inspectors and check on any schedule changes.
   d. Visit Owner's representatives periodically to find out if they have any concerns with how project is progressing.

1.7 QUALITY CONTROL

A. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor. They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
   1. Where services are indicated as Contractor's responsibility, engage a qualified Testing Agency to perform these quality control services.
      a. Contractor shall not employ same testing entity engaged by Owner, without Owner's written approval.

B. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed Work:
   1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
   2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
   3. Demonstrate proposed range of aesthetic effects and workmanship.
   4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
      a. Allow seven days for initial review and each re-review of each mockup.
   5. Maintain mockups during construction in undisturbed condition as standard for judging completed Work.
      a. Demolish and remove mockups when directed, unless otherwise indicated.

C. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300: "Submittal Procedures."

D. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify Testing Agency sufficiently in advance of operations to permit assignment of personnel. Provide following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist Testing Agency in obtaining samples.

4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require quality control by Testing Agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Structural Masonry Units, Reinforcing, Mortar, and Grout:
      a. Review inspection requirements.
      b. Review inspection frequency.
      c. Review masonry design material submittals.
      d. Review other material submittals.
      e. Prepare non-compliance log to track non-compliant testing or inspections.
   2. Reinforced Concrete:
      a. Obtain daily concrete placement schedule from Contractor.
      b. Verify that reinforcing has been placed as per Contract Documents.
      c. Sign concrete placement pour card prior to concrete placement.
      d. Monitor concrete placement to ensure that concrete is properly consolidated and reinforcing steel is not displaced.
      e. Sample and place concrete according to required frequency stated in project specifications.
      f. Sample at point of placement.
      g. Test slump, air content, air temperature, concrete temperature, unit weight (if required), and cast required number of test cylinders.
      h. Record test results and communicate to designated parties.
      i. Report non-compliant tests or inspections to contractor, Quality Assurance Manager, and other designated parties.
         1) Transport test cylinders to laboratory for curing and compressive strength testing
   3. Aggregate Base:
      a. Provide required observation and testing of placed fill.
      b. Become familiar with geotechnical report recommendations.
      c. Verify material compaction requirements.
      d. Verify that materials used for fill meet qualifications.
      e. Obtain representative samples of fill materials for proctor value determination and classification.
      f. Provide density testing of placed fill at specified frequency.
      g. Obtain occasional samples of fill to verify that correct proctor value is being used.
      h. Document every test performed.
      i. Report test locations with building gridlines (if possible).
      j. Document failing tests and report retests when performed.
      k. Provide copy of daily report and test results to Quality Assurance manager.
      l. Distribute daily reports and test results to designated parties.
   4. Steel:
      a. Review inspection requirements.
      b. Review inspection frequency.
      c. Review welding certificates.
      d. Prepare non-compliance log to track non-compliant testing or inspections.
   5. Asphalt Paving:
      a. Review inspection requirements.
      b. Review inspection frequency.
      c. Review design material submittals.
      d. Prepare non-compliance log to track non-compliant testing or inspections.
   6. Weekly Activities:
      a. Ensure that non-compliance log is current.
      b. Provide summary reports of performed Work.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified Testing Agency to conduct special tests and inspections required by authorities having jurisdiction as responsibility of Owner, and as follows:
   1. Requirements of Section 01 4523: “Testing and Inspecting Services” apply.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
   2. Comply with Contract Document requirements for Section 01 7300 “Execution” for Cutting and Patching.

B. Protect construction exposed by or for Quality Assurance and Quality Control activities.

C. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

END OF SECTION

B L A N K P A G E

SECTION 01 4100

REGULATORY REQUIREMENTS

1.1 ASBESTOS

A. Contract Documents for this Project have been prepared in accordance with generally accepted professional architectural and engineering practices. Accordingly, no asbestos or products containing asbestos have been knowingly specified for this Project. Notify Architect immediately for instructions if materials containing asbestos are brought to site for inclusion in the Work.

B. At Architect's direction and with Owner's approval, a certified asbestos inspector will collect samples and an independent testing laboratory will perform testing procedures on suspect materials.

C. Certify that based upon best knowledge, information, inspection, and belief no building materials containing asbestos were used in construction of Project. Submit certification on form provided by Owner.

END OF SECTION

B L A N K P A G E

SECTION 01 4200

REFERENCES

1.1 REFERENCE STANDARDS

A. Industry Standards:
1. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.
2. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.
3. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.
4. Trade Association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean association names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

ACI	American Concrete Inst International	Farmington Hills	MI	(248) 848-3700	www.aci-int.org
AIA	American Inst of Architects	Washington	DC	(202) 626-7300	www.aiaonline.com
ANSI	American National Standards Inst	New York	NY	(212) 642-4900	www.ansi.org
ASTM	ASTM International	West Conshohocken	PA	(610) 832-9585	www.astm.org
AWI	Architectural Woodwork Inst	Reston	VA	(703) 733-0600	www.awinet.org
AWPA	American Wood Preservers' Assoc	Granbury	TX	(817) 326-6300	www.awpa.com
BHMA	Builders Hardware Manufacturers Assoc	New York	NY	(212) 297-2100	www.buildershardware.com
CFI	International Certified Floorcovering Installers Assoc	Kansas City	MO	(816) 231-4646	www.cfi-installers.org
CRI	Carpet & Rug Inst	Dalton	GA	(800) 882-8846	www.carpet-rug.com
CISPI	Cast Iron Soil Pipe Inst	Chattanooga	TN	(423) 892-0137	
DHI	Door & Hardware Inst	Chantilly	VA	(703) 222-2010	www.dhi.org
FM	FM Global	Johnston	RI		www.fmglobal.com
GA	Gypsum Assoc	Washington	DC	(202) 289-5440	www.gypsum.org
HPVA	Hardwood Plywood & Veneer Assoc	Reston	VA	(703) 435-2900	www.hpva.org
ICBO	International Conference of Building Officials	Whittier	CA	(800) 423-6587	www.icbo.org
MSS	Manufacturer's Standardization Society of The Valve and Fittings Industry	Vienna	VA	(703) 281-6613	www.mss-hq.com
NAAMM	National Assoc of Architectural Metal Manufacturers	Chicago	IL	(312) 332-0405	www.naamm.org
NEC	National Electric Code	(from NFPA).			
NEMA	National Electrical Manufacturer's Assoc	Rosslyn	VA	(703) 841-3200	www.nema.org

NFPA	National Fire Protection Assoc	Quincy	MA	(800) 344-3555	www.nfpa.org
PCA	Portland Cement Assoc	Skokie	IL	(847) 966-6200	www.portcement.org
PEI	Porcelain Enamel Inst	Nashville	TN	(615) 385-5357	www.pocelainenamel.com
SMACNA	Sheet Metal & Air Conditioning Contractors National Assoc	Chantilly	VA	(703) 803-2980	www.smacna.org
SPIB	Southern Pine Inspection Bureau	Pensacola	FL	(850) 434-2611	
SSMA	Steel Stud Manufacturer's Assoc	Chicago	IL	(312) 332-0405	www.ssma.com
TCA	Tile Council of America	Anderson	SC	(864) 646-8453	www.tileusa.com
UL	Underwriters Laboratories	Northbrook	IL	(847) 272-8800	www.ul.com
WDMA	Window and Door Manufacturer's Assoc	Des Plaines	IA	(847) 299-5200	www.nwwda.org
WWPA	Western Wood Products Assoc	Portland	OR	(503) 224-3930	www.wwpa.org

B. Federal Government Agencies:
1. Names and titles of federal government standard or specification producing agencies are often abbreviated. Following acronyms or abbreviations referenced in Contract Documents represent names of standard or specification producing agencies of federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

CS	Commercial Standard (U S Department of Commerce)	Washington	DC	(202) 512-0000	www.doc.gov
EPA	Environmental Protection Agency	Washington	DC	(202) 260-2090	www.epa.gov
FCC	Federal Communications Commission	Washington	DC	(202) 418-0126	www.fcc.gov
FS	Federal Specifications Unit (Available from GSA)	Washington	DC	(202) 619-8925	www.gsa.gov
MIL	Military Standardization Documents (U S Department of Defense)	Philadelphia	PA	(215) 697-2179	www.dod.gov
OSHA	Occupational Safety & Health Administration (U S Department of Labor)	Washington	DC	202) 219-8148	www.osha.gov
PS	Product Standard of NBS (U S Department of Commerce)	Washington	DC	(202) 512-1800	www.doc.gov

C. Governing Regulations / Authorities:
1. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
2. Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

END OF SECTION

SECTION 01 4301

QUALITY ASSURANCE - QUALIFICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Requirements:
1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.

1.2 REFERENCES

A. Definitions:
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
3. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
4. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.

B. Reference Standards:
1. ASTM International:
a. ASTM E329-11a, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'

1.3 QUALIFICATIONS

A. Qualifications: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:
1. Fabricator / Supplier / Installer Qualifications: Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
a. VMR (Value Managed Relationship):
1) Where heading '*VMR (Value Managed Relationship) / Manufacturers / Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project.
2) No other *Suppliers / Installers* will be acceptable.
3) Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
b. Acceptable Suppliers / Installers:

1) Where heading '*Acceptable Suppliers / Installers / Fabricators*' is used, qualifications as specified in Quality Assurance in Part 1 of individual sections will be used to determine requirements of those that will be acceptable to be used on Project. Lists for acceptable installers can include additional installers that may be approved before bidding or by addendum.

2. Factory-Authorized Service Representative Qualifications:
   a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
3. Installer Qualifications:
   a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
4. Manufacturer Qualifications:
   a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
5. Manufacturer's Field Services Qualifications:
   a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. Professional Engineer Qualifications:
   a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
   a. Certain sections of Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.
   b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
   c. Requirement for specialists shall not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:
   a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
      1) Testing Laboratory:
         a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
         b) Cement and Concrete Reference Laboratory (CCRL).
         c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
         d) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4500

QUALITY CONTROL

1.1 FIELD QUALITY CONTROL PROCEDURES

A. Inspection and testing by Owner, Architect, Contractor, their consultants or government agencies to examine Work performed by Contractor does not relieve Contractor of responsibility for compliance with Contract Documents.

B. Quality control services include inspections, tests and related actions including reports, performed by Contractor. They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
   1. Contractor and each agency engaged to do inspections, tests, and similar services will coordinate sequence of activities to accommodate required services with minimum of delay. In addition, Contractor and each agency will coordinate activities to avoid necessity of removing and replacing construction to accommodate inspections and tests. Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.
   2. Provide inspections, tests, and similar quality control services specified in individual specification Sections or required by governing authorities.
   3. Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct the deficiencies in the Work.
   4. Cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify agency sufficiently before operations to allow assignment of personnel. Auxiliary services required include but are not limited to -
      a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
      b. Taking adequate quantities of representative samples of materials that require testing or helping agency in taking samples.
      c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      d. Providing agency with preliminary design mix proposed for use for materials mixes that require control by testing agency.
      e. Securing and protecting samples and test equipment at Project site.

C. Upon completion of inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Documents in making such repairs.

D. Protect construction exposed by or for quality control service activities, and protect repaired construction.

E. Repair and protection is Contractor's responsibility, regardless of who caused the inspection, testing, or similar services.

1.2 TESTING AND INSPECTING SERVICES

A. Engage inspection and testing service agencies, including independent testing laboratories, only with written approval of Architect. Each independent inspection and testing agency engaged on Project will be licensed and authorized to operate in the jurisdiction in which Project is located.

B. Duties of Testing Agency:
   1. Independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and

Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.

2. Agency will notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
3. Agency is not authorized to release, revoke, alter, or enlarge requirements of Contract Documents, or approve or accept any portion of the Work.
4. Agency will not perform any duties of Contractor.

C.Submittals:

1. Independent testing agency will submit certified written report of each inspection, test, or similar service, to Architect, in duplicate, unless Contractor is responsible for service. If Contractor is responsible for service, submit certified written report of each inspection, test, or similar service through Contractor, in duplicate.
   a. Submit additional copies of each written report directly to governing authority, when authority so directs.
   b. Written reports of each inspection, test, or similar service will include, but not be limited to:
      1) Date of issue.
      2) Project title and number.
      3) Name, address and telephone number of testing agency.
      4) Dates and locations of samples and tests or inspections.
      5) Names of individuals making the inspection or test.
      6) Designation of the Work and test method.
      7) Identification of product and specification Section.
      8) Complete inspection or test data.
      9) Test results and interpretations of test results.
      10) Ambient conditions at time of sample-taking and testing.
      11) Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
      12) Name and signature of laboratory inspector.
      13) Recommendations on retesting.

END OF SECTION

SECTION 01 4523

TESTING AND INSPECTING SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods as specified hereafter for the Work.

B. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures to fully comply with Contract Document requirements in all regards.

C. Costs: Costs of initial services for testing and inspection personnel will be paid by Owner unless otherwise noted.
   1. If initial tests indicate non-compliance with contract document requirements, any subsequent testing will be performed by same personnel and paid for by Contractor.

D. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance Qualifications' establishes minimum qualification levels required.
   3. Division 01 through Division 49 establish responsibility for providing specific testing and inspections and Field Tests and Inspections.

1.3 REFERENCES

A. Association Publications:
   1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
   2. International Code Council (IBC):
      a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions:
   1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
   2. Approved: To authorize, endorse, validate, confirm, or agree to.
   3. Contract Documents: Engineering and Architectural Drawings and Specifications issued for construction, plus clarification drawings, addenda, approved change orders and contractor designed elements.
   4. Experienced: When used with an entity, "experienced" means having successfully completed minimum of five previous projects similar in size and scope to this Project; being familiar with requirements indicated; and having complied with requirements of authorities having jurisdiction.

5. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
6. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
   a. Inspection: Not required by code provisions but may be required by Contract Documents.
   b. Special Inspection: Required by code provisions and by Contract Documents.
   c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
7. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
   a. Using term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as "carpenter."
   b. It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.
8. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
9. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
10. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
11. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
12. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
13. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
14. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
15. Relative Compaction: Ratio of field dry density as determined by ASTM D6938 or ASTM D2216, and laboratory maximum dry density as determined by ASTM D1557.
16. Service Provider: Agency or firm qualified to perform required tests and inspections.
17. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
18. Special Inspection: See Inspection.
19. Special Inspector: Certified individual or firm that implements special inspection program for project.
20. Special Test: See Test.
21. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
   a. Test: Not required by code provisions but may be required by Contract Documents.
   b. Special Test: Required by code provisions and by Contract Documents.
22. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
23. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.

24. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
   1. ASTM International:
      a. ASTM C1021-08, 'Standard Practice for Laboratories Engaged in Testing of Building Sealants'.
      b. ASTM C1077-11b, 'Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation'.
      c. ASTM C1093-11, 'Standard Practice for Accreditation of Testing Agencies for Masonry.
      d. ASTM D3666-09a, 'Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.
      e. ASTM D3740-11, 'Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction'.
      f. ASTM E329-11b: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
      g. ASTM E543-09, 'Standard Specification for Agencies Performing Nondestructive Testing'.
      h. ASTM E1212-09, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.

1.4 SUBMITTALS

A. Informational Submittals:
   1. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 49.
   2. Certificates:
      a. Testing Agency will submit certified written report of each inspection, test, or similar service.
   3. Tests and Evaluation Reports:
      a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies (or electronic record) distributed as follows:
         1) 1 copy to Owner's Representative.
         2) 1 copy to Architect.
         3) 1 copy to Consulting Engineers (Engineer of Record).
         4) 1 copy to General Contractor.
         5) 1 copy to Authorities Having Jurisdiction (if required).
      b. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner's Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
   4. Source Quality Control Submittals:
      a. Testing Agency will submit following prior to commencing the Work:
         1) Qualifications of Testing Agency management and personnel designated to project.
         2) Testing Agency 'Written Practice for Quality Assurance'.
         3) Qualification records for Inspector and non-destructive testing technicians designated for project.
         4) Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
         5) Testing Agency Quality Control Plan for monitoring and control of testing operations.
         6) Welding Inspection Procedures (Structural Steel testing).
         7) Bolting Inspection Procedures (Structural Steel testing).
         8) Shear Connector Stud Inspection Procedures (Structural Steel testing).
         9) Seismic Connections Inspection Procedures (Structural Steel testing).

1.5 QUALITY ASSURANCE

A. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.

B. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.

C. Certification: Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.

D. Written Practice for Quality Assurance: Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

1.6 QUALITY CONTROL

A. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.

B. Contractor will assign one employee to be responsible for Quality Control. This individual may have other responsibilities and may be Contractor's Project superintendent or Contractor's Project Manager.

C. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and Owner's Representative within twenty four (24) hours of test or inspection having been performed.
   1. Testing and Inspection Reports will be distributed as follows:
      a. 1 copy to Owner's Representative.
      b. 1 copy to Architect.
      c. 1 copy to Consulting Engineer(s) (Engineer of Record).
      d. 1 copy to Authorities Having Jurisdiction (if required).

1.7 TESTS AND INSPECTIONS - GENERAL

A. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.

B. Individual Sections in Division 01 through Division 49 indicate if Owner will provide testing and inspection of the Work of that Section.

C. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements. Contractor must cooperate with persons and firms engaged in these activities.

D. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 49.

E. Taking Specimens:
   1. Except as may be specifically otherwise approved by Architect, only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.

F. Scheduling Testing Agency:
   1. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
   2. Contractor will notify Testing Agency and Architect to schedule tests and / or inspections.
      a. Architect will notify Owner's Representative before each test and / or inspection.

G. For 'building-wide' and/or life safety systems, such as emergency lighting, emergency power uninterruptible power supply systems, fire alarm, fire sprinkler systems, smoke evacuation systems, toxic gas monitoring, capturer exhaust systems, etc. formal start-up inspection will be completed prior to requesting Substantial Completion Inspection for any area of Project:
   1. Manufacturer's representatives and installing contractor will demonstrate both operation and compliance to Owner's agents and consultants. If coordinated and scheduled appropriately by Contractor, these equipment and/or systems inspections may also serve to provide required Owner training, if approved in advance by Owner.
   2. Contractor responsible for requesting that Architect arrange for inspection of materials, equipment, and work prior to assembly or enclosure that would make materials, equipment, or work inaccessible for inspection and at other times as may be required.

1.8 ARCHITECT'S RESPONSIBILTY

A. Architect Duties:
   1. Notify Owner's Representative before each test and/or inspection.

1.9 CONTRACTOR'S RESPONSIBILITY

A. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.

B. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.

C. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
   1. Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
   2. Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
   3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
   4. Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.

D. Contractor will integrate Owner's independent Testing Agency services within Baseline Project Schedule and with other Project activities.

E. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.

F. All Work is subject to testing and inspection and verification of correct operation prior to 100% payment to Contractor of line item(s) pertaining to that aspect of the Work.

G. For Mechanical Equipment, inspection and documented approval of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by said equipment and/or system.
   1. Contractor will perform thorough checkout of operations with manufacturer's representatives prior to requesting formal inspection by Owner. Contractor must notify Owner's Representative, in advance, as to when manufacturer's representative is scheduled to arrive at Site.

H. Comply:
   1. Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
   2. Comply with Contract Documents in making such repairs.

I. Data: Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.

J. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements:
   1. Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid Work delays.
   2. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
   3. Contractor responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
   4. Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
   5. Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.

K. Protection:
   1. Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.

L. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.
   1. Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover Work for testing or inspection.
   2. Notify Testing Agency and Architect as noted in Sections in Division 01 through Division 49 prior to any time required for such services.
   3. Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
   4. Schedule sequence of activities to accommodate required services with minimum of delay.
   5. Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.

M. Test and Inspection Log:
   1. Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following:
      a. Date test or inspection was conducted.
      b. Description of the Work tested or inspected.
      c. Date test or inspection results were transmitted to Architect.
      d. Identification of Testing Agency or inspector conducting test or inspection.
   2. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

1.10 TESTING AGENCY SERVICES AND RESPONSIBILITIES

A. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located.
   1. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.

B. Testing and Inspection Services:
   1. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
   2. Testing Agency will not give direction or instruction to Contractor.
   3. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
   4. Testing Agency will not provide additional testing and inspection services beyond scope of Work without prior approval of Owner's Representative and / or Architect.

C. Testing Agency Duties:
   1. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   2. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   3. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   4. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
   5. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
   6. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
   7. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and will verify compliance with all reference standard requirements.

D. Testing and Inspection Reports:
   1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
   2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
      a. Description of method of test.
      b. Identification of sample and portion of the Work tested.
         1) Description of location in the Work of sample.
         2) Time and date when sample was obtained.
         3) Weather and climatic conditions at time when sample was obtained.
      c. Evaluation of results of tests including recommendations for action.
   3. Inspection Reports: Testing Agency will furnish 'Inspection at Site' reports for each site visit documenting activities, observations, and inspections. Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
   4. Reporting Testing and Inspection (Conforming Work):
      a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
   5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
      a. Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:

1) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.

6. Final Report:
   a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Field Tests and Inspections requirements are described in 'Field Quality Control' in Division 01 through Division 49 Sections.

END OF SECTION

SECTION 01 5100

TEMPORARY UTILITIES

1.1 ADMINISTRATIVE REQUIREMENTS

A. Where necessary, engage appropriate local utility companies to install temporary service or connect to existing service. Where utility company provides only part of service, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations.
   1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
   2. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
   3. Arrange with utility company and existing users for time when service can be interrupted, where necessary, to make connections for temporary services.
   4. Provide adequate capacity at each stage of construction. Before temporary utility availability, provide trucked-in services.
   5. Obtain construction easements necessary to bring temporary and/or permanent utilities to site.
   6. Use qualified personnel for installation and maintenance of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with the Work of Owner or other Contractors on Project Site. Relocate and modify facilities as required.
   7. Pay cost and use charges for temporary facilities and utilities.

B. Prepare schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time and when acceptable to Owner, change over from use of temporary service to use of permanent service.

C. Keep temporary utilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.

D. Limit availability of temporary utilities to essential and intended uses to reduce waste and abuse.

E. Maintain utilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
   2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

F. Remove each temporary utility and control when need has ended, or when replaced by authorized use of permanent utility, or by Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary utility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that make up temporary utilities are property of Contractor.
   2. By Substantial Completion, clean and renovate permanent utilities used during construction period, including but not limited to:
      a. Replace air filters and clean inside of ductwork and housings.
      b. Replace significantly worn parts and parts subjected to unusual operating conditions.
      c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

1.2 TEMPORARY ELECTRIC POWER

A. Owner will provide power for construction activities within the limits available at existing facility. Provide temporary wiring, outlets, ect, complying with the local codes and Article 305, Temporary Wiring of the MEC.

B. If necessary provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.

1.3 TEMPORARY FIRE PROTECTION

A. Install and maintain temporary fire protection facilities of types needed to protect against predictable and controllable fire losses. At a minimum, provide and maintain in working order two Standard UL Labeled ABC all-purpose 10 lb fire extinguishers. Do not incorporate these extinguishers into final Project.
   1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
   2. Store combustible materials in containers in fire-safe locations.
   3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires.

1.4 HEATING, COOLING, AND VENTILATING:

A. Existing facility mechanical system may be operated subject to the following conditions:
   1. Do not operate system when work causing air-borne dust is occurring or when dust caused by such work is present without installation of temporary filtering system approved by Architect.
   2. Operate system at no cost to Owner, including cost of fuel.
   3. Assume all responsibility and risk for operation of system.
   4. Return permanent mechanical equipment to 'like-new' condition for Substantial Completion Inspection.

1.5 TEMPORARY LIGHTING

A. If necessary install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

1.6 TEMPORARY TELEPHONES

A. Provide temporary telephone service for all personnel engaged in construction activities, throughout construction period.

1.7 TEMPORARY WATER SERVICE

A. Owner will allow Contractor usage of water required for construction purposes, to the extent of existing facilities.

1.8 CONSTRUCTION FACILITIES

A. General
   1. Field offices, storage sheds, and other temporary construction and support facilities for easy access. – are not allowed for this project. The Contractor may use the project space for a field

office.

B. Storage & Fabrication Sheds - Not allowed for this project.

C. Sanitary Facilities
1. Existing Rest Room facilities may be used. Clean Rest Rooms daily and restore to existing condition before Substantial Completion.
2. If existing facilities are not usable, provide and maintain temporary sanitary toilet. Provide facility that will enable lawful removal and disposal of effluent off site.
3. Maintain temporary facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

1.9 TEMPORARY BARRIERS & ENCLOSURES

A. Barricades, Warning Signs, & Lights
1. Comply with standards and code requirements for erection of structurally adequate barricades. Guardrails around openings in floors or roofs shall be at least 42 inches in height. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
2. Install and maintain necessary precautions to protect persons on site, including members of the public, from injury or harm, including but not limited to -
   a. Posting of appropriate warning signs in hazardous areas.
   b. Providing guardrails and barricades around obstructions, pits, trenches, and similar areas in on-site or adjacent streets, roads, sidewalks, or on site of structure itself.

B. Security Measures
1. Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
2. When materials and equipment must be stored and are of value or attractive for theft, provide secure lockup. Enforce discipline concerning installation and release of material to reduce opportunity for theft and vandalism.
3. Existing keying system shall remain in existing building. Contractor will be given keys necessary to reach portions of the building requiring work.
4. Keys shall not be used by or lent to others. Be responsible for building and contents while work is being performed and for securing building when work is finished for the day.

C. Environmental Protection
1. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.
2. Provide protection against weather (rain, winds, storms, frost, or heat) to maintain all work, materials, apparatus, and fixtures free from injury or damage. At end of day's work, cover new work likely to be damaged.
   a. During cold weather, protect the Work from damage. If low temperatures make it impossible to continue operations safely in spite of cold weather precautions, cease work and so notify Architect.
   b. Remove snow and ice as may be required for proper protection and prosecution of the Work.

D. Protection of Existing Work -

1. Protect existing building, and make necessary repairs for damage thereto during course of the Work at no additional expense to Owner.
2. Work damaged by failure to provide protection shall be removed and replaced with new work at no additional expense to Owner.

E. Removal of Protection - Remove temporary protection and facilities installed for protection of the Work during construction.

END OF SECTION

SECTION 01 5400

CONSTRUCTION AIDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Construction Aids.

1.2 SCAFFOLDING, PLATFORMS, STAIRS, ETC

A. Furnish and maintain equipment such as temporary stairs, ladders, ramps, platforms, scaffolds, hoists, runways, derricks, chutes, and elevators as required for proper execution of The Work.

B. Apparatus, equipment, and construction shall meet requirements of applicable laws and safety regulations.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

B L A N K P A G E

SECTION 01 5600

TEMPORARY BARRIERS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Temporary Barriers and Enclosures.

1.2 GENERAL

A. Protection Of Existing Improvements: Protect streets, private roads, and sidewalks, including overhead protection where required. Repair damage to existing improvements caused by construction activities.

B. Protection Of Adjacent Property: Provide necessary protection for adjacent property and lateral support thereof.

1.3 TEMPORARY AIR BARRIERS

A. Protect all existing facilities from construction zones with fully sealed air barriers. Barrier shall include sealable access ports.

B. Barrier shall not encroach on any egress route or corridor by more than 3 feet.

1.4 TEMPORARY DUST BARRIERS

A. Protect all existing facilities from construction zones with fully sealed dust barriers. Barrier shall include sealable access ports.

B. Barrier shall not encroach on any egress route or corridor by more than 3 feet.

1.5 TEMPORARY NOISE BARRIERS

A. As directed by the Owner, protect all existing facilities from construction zones with fully sealed noise barriers. Barrier shall include sealable access ports.

B. Barrier shall not encroach on any egress route or corridor by more than 3 feet.

C. Barrier shall consist of 3-5/8” metal stud framing with sound batt insulation and 5/8” gypsum wall board both sides. All doors shall include sound gaskets.

1.6 TEMPORARY BARRICADES

A. Comply with standards and code requirements in erecting barricades, warning signs, and lights.

B. Take necessary precautions to protect persons, including members of the public, from injury or harm.

1.7 TEMPORARY FENCING

A. Before construction begins, install 6 foot high enclosure fence with lockable entrance gates. Locate where shown on Drawings. If not shown on Drawings, enclose entire site or portion sufficient to accommodate construction operations.

1.8 TEMPORARY SECURITY BARRIERS

A. Install temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and other violations of security.

B. Secure materials and equipment stored on site.

C. Secure building at the end of each work day.

D. Maintain exterior building security until Substantial Completion.

1.9 TEMPORARY TREE AND PLANT PROTECTION

A. Protection:
   1. Before commencing site work, build and maintain protective fencing around existing trees and vegetation as shown on the drawings.
   2. Individual trees will have protective fencing built beyond drip line.
   3. Build protective fencing around groups of trees and other vegetation as indicated on Drawings.
   4. Keep areas within protective fencing undisturbed and do not use for any purpose.

B. Maintenance:
   1. Maintain existing tree, shrubs, and vegetation as indicated in Contract Documents:
      a. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
      b. Damage to any tree, shrub, or vegetation that has been indicated to remain and be protected, will have a cost associated with it. This includes branches, trunk and root systems:
         1) Trees: $1,000.00.
         2) Shrubs: $ 100.00.
         3) Vegetation: $ 50.00.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6100

COMMON PRODUCT REQUIREMENTS

1.1 SUMMARY

A. Provide products that comply with Contract Documents, that are undamaged, and, unless otherwise indicated, new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

B. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
   1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
   2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

C. Where specifications describe a product or assembly by specifying exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides specified characteristics and otherwise complies with Contract requirements.

D. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.

E. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.

F. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.

G. Where specified product requirements include phrase ` . . . *as selected from manufacturer's standard colors, patterns, textures* . . . ' or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

H. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.

END OF SECTION

B L A N K P A G E

SECTION 01 6200

PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Product Options.

1.2 GENERAL

A. Product Selection:
   1. When option of selecting between two or more products is given, product selected will be compatible with products previously selected, even if previously selected products were also options.

B. Non-Conforming Work:
   1. Non-conforming work as covered in Article 12.3 of General Condition**s** applies, but is not limited, to use of non-specified products or manufacturers.

C. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
   1. Substitutions And Equal Products:
      a. Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Acceptable Products / Manufacturers / Suppliers / Installers:
         1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect by Addendum.
         2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect in writing before installing or applying unlisted or private-labeled products.
         3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.
      c. Quality / Performance Standard Products / Manufacturers:
         1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
         2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
         3) Products / manufacturers used shall conform to Contract Document requirements.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

B L A N K P A G E

SECTION 01 6400

OWNER - FURNISHED PRODUCTS

1.1 SUMMARY

A. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents.
   1. Keybox:

1.2 ADMINISTRATIVE REQUIREMENTS

A. General:
   1. Review 'Contractor Notification Report' listing Owner-furnished products to be delivered for Project.
      a. Review delivery dates and vendor lead times for each item and coordinate with construction schedule. Immediately report recommended changes to Owner's Purchasing Coordinator listed in 'Contractor Notification Report.' Contact vendors directly if changes to delivery dates become necessary during construction.
      b. Report problems in coordinating delivery dates with construction schedule to Architect and Owner's Purchasing Coordinator.
   2. Receive and unload Owner-furnished materials and products.
      a. Provide labor and equipment necessary to receive, unload, and store materials and products.
      b. Verify that number of packages received matches number listed on bill of lading.
      c. Check for external damage.
      d. Note discrepancies between pieces received and pieces listed on bill of lading as well as instances of visible damage on bill of lading before signing. Include Project Name and Project Number on bill of lading
      e. Store and protect deliveries. Report deliveries made outside of delivery schedule to Owner's Purchasing Coordinator.
   3. Within 24 hours of delivery:
      a. Open and inspect each piece of freight delivered. Note concealed damage not observed at time of delivery.
      b. Compare 'Contractor Notification Report' with packing slips. Note discrepancies in number, size, color, model numbers, etc.
      c. Deliver bills of lading on which loss or damage is recorded, or copy, to Owner's Purchasing Coordinator together with report of concealed damage and discrepancies.
      d. Notify Owner's Purchasing Coordinator immediately of damage and discrepancies.
   4. As directed by Owner, either repair or replace shortages and damaged items not recorded and reported as specified above at no additional cost to Owner.

END OF SECTION

B L A N K P A G E

SECTION 01 6500

PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

1.1 SUMMARY

A. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1.2 DELIVERY

A. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.

B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

C. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

D. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

1.3 STORAGE

A. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.

B. Store heavy materials away from Project structure so supporting construction will not be endangered.

C. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

END OF SECTION

B L A N K P A G E

SECTION 01 7300

EXECUTION

1.1 COMMON INSTALLATION PROVISIONS

A. Manufacturer's Instructions: Comply with Manufacturer's installation instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.

B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.

C. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.

D. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.

E. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.

F. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

END OF SECTION

B L A N K P A G E

SECTION 01 7400

CLEANING AND WASTE MANAGEMENT

1.1 PROGRESS CLEANING

A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.

B. Keep premises broom clean during progress of the Work.

C. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.

D. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.

E. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.

F. Supervise construction activities to ensure that no part of construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

G. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.

H. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.

I. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.

J. Construction Waste Management And Disposal:
   1. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally. Remove unsuitable or damaged materials and debris from building and from property.
      a. Provide adequate waste receptacles and dispose of materials when full.
      b. Properly store volatile waste and remove daily.
      c. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
   2. Do not burn waste materials or build fires on site. Do not bury debris or excess materials on Owner's property.

1.2 FINAL CLEANING

A. Immediately before Substantial Completion, thoroughly clean building and area where The Work was performed. Remove all rubbish from under and about building, landscaped areas and parking lot and leave building and Project Site ready for occupancy by Owner.

B. Comply with individual manufacturer's cleaning instructions.

C. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:

1. Interior Cleaning:
   a. Clean inside glazing, exercising care not to scratch glass.
   b. Remove marks, stains, fingerprints and dirt.
   c. Clean and polish woodwork and finish hardware.
   d. Remove labels that are not permanent labels.
   e. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
   f. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
   g. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
   h. Remove temporary floor protection and clean floors.
2. Exterior Cleaning:
   a. Remove marks, stains, and dirt from exterior surfaces.
   b. Remove temporary protection systems.
   c. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.
   d. Remove trash, debris, and foreign material from landscaped areas.

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

1.1 GENERAL:

A. Schedule closeout procedures in the two weeks before expiration of Contract Time. Weeks will be marked by three Architect's weekly visits before Final Closeout Review, Final Closeout Review, and expiration of Contract Time.

B. Date of Substantial Completion shall fall within week between Architect's final weekly visit and Final Closeout Review. Date of Substantial Completion shall not occur until Construction Schedule shows completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

1.2 PRELIMINARY CLOSEOUT REVIEWS

A. Confirm with Architect when Substantial Completion of The Work will be achieved.
   1. Final three Architect's weekly visits will serve as Preliminary Closeout Reviews to determine if Final Closeout Review will occur as scheduled and that Substantial Completion of the Work will be achieved by that date.
   2. By final weekly Architect visit, notify Owner and Architect of date when Substantial Completion of The Work will be achieved.

B. Arrange with Architect date for Final Closeout Review to confirm Substantial Completion.

1.3 CLOSEOUT REQUIREMENTS

A. Before Final Closeout Review:
   1. Deliver Closeout Submittals to Architect.
   2. Deliver tools, spare parts, extra stock, and similar items as required by the Contract Documents.
   3. Complete start-up testing of systems, and instruction of Owner's maintenance personnel as required by the Contract Documents.
   4. Discontinue or change over and remove temporary facilities from site, along with construction tools, mock-ups, and similar elements.
   5. Complete final cleaning requirements.

1.4 FINAL CLOSEOUT REVIEW

A. Participate in Final Closeout Review.

B. When Owner and Architect have confirmed that Contractor has achieved Substantial Completion of The Work, Owner, Architect, and Contractor will execute Certificate of Substantial Completion that contains:
   1. Date of Substantial Completion.
   2. Punch List of Work not yet accepted.
   3. Amount to be withheld for completion of Punch List work.
   4. Time period for completion of Punch List work.
   5. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List work within time set forth in Certificate.

C. Final Acceptance Conference:
   1. Notify Architect in writing when work on Punch List has been completed.

2. Arrange with Architect date and time for Final Acceptance Conference.
3. When Owner and Architect have confirmed that Contractor has completed Punch List work, Architect will issue letter to Owner authorizing final payment.

END OF SECTION

SECTION 01 7800

CLOSEOUT SUBMITTALS

1.1 GENERAL

A. Workmanship bonds, final certifications, equipment check-out sheets, and similar documents.

B. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

C. Project photographs, damage or settlement survey, and similar record information required by Contract Documents.

1.2 OPERATIONS AND MAINTENANCE DATA

A. Operations And Maintenance Manuals that include:
   1. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction.
      a. Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications. Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
      b. Note related record drawing information and Product Data.
   2. Operations and maintenance submittals required by Contract Documents.
   3. Certifications required by Contract Documents.
   4. Copies of warranties required by Contract Documents.

1.3 WARRANTIES

A. When written guarantees beyond one year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manuals specified above.

B. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

1.4 PROJECT RECORD DOCUMENTS

A. Do not use record documents for construction purposes. Protect from deterioration and loss in secure, fire-resistive location. Provide access to record documents for Architect's reference during normal working hours.

B. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
   2. Mark new information that is important to Owner, but was not shown on Drawings.
   3. Note related Change Order numbers where applicable.

END OF SECTION

B L A N K P A G E

SECTION 02 4119

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled.

B. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 241, 'Standard for Safeguarding Construction, Alteration, and Demolition Operations', 2009 Edition.
   2. American National Standards Institute / American Society of Safety Engineers:
      a. ANSI / ASSE A10.6-2006, 'Safety Requirements for Demolition Operations.'

C. Related Requirements:
   1. Section 01 5600 'Temporary Barriers and Enclosures'

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Storage or sale of removed items or materials will not be permitted on-site.

B. Pre-Installation Conference:
   1. Before beginning Selective Demolition work, in addition to requirements of Section 01 3100, meet on site to confirm work to be demolished, items to be salvaged or reused, and coordination with Owner.

C. Scheduling:
   1. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, on Schedule specified in Section 01 3200.

1.3 SUBMITTALS

A. Special Procedure Submittals:
   1. Inventory:
      a. After selective demolition is complete, submit list of items that have been removed and salvaged.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Comply with governing EPA notification regulations before beginning selective demolition.
   2. Comply with hauling and disposal regulations of authorities having jurisdiction.
   3. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 FIELD CONDITIONS

A. Existing Conditions:
   1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
      a. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Evaluation And Assessment:
   1. Hazardous Materials:
      a. It is not expected that hazardous materials will be encountered in the Work. Identified hazardous materials will be removed by Owner before start of the Work.
      b. If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Architect.
   2. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged.
   3. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure nature and extent of conflict. Promptly submit written report to Architect.
   4. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

A. Temporary Facilities:
   1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   2. Maintain fire-protection facilities in service during selective demolition operations.

B. Temporary Shoring:
   1. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   2. Strengthen or add new supports when required during progress of selective demolition.

C. Utility Services:
   1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
      a. Arrange to shut off indicated utilities with utility companies.

b. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 SELECTIVE DEMOLITION

A. General:
1. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
2. Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   a. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   b. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   c. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   d. Maintain adequate ventilation when using cutting torches.
   e. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   f. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   g. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   h. Dispose of demolished items and materials promptly.

B. Selective Demolition Procedures For Specific Materials:
1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
2. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Removed and Salvaged Items:
1. Relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
   a. Clean salvaged items as directed by Owner.
   b. Pack or crate items after cleaning. Identify contents of containers.
   c. Store items in a secure area until delivery to Owner.
   d. Transport items to Owner's storage area designated by Owner.
   e. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain:
   1. Protect construction indicated to remain against damage and soiling during selective demolition.
   2. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 CLEANING

A. General:
   1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
   2. Return adjacent areas to condition existing before selective demolition operations began.

B. Waste Management:
   1. Disposal of Demolished Materials:
      a. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Do not burn demolished materials.
         1) Do not allow demolished materials to accumulate on-site.
         2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
         3) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

END OF SECTION

SECTION 03 1113

STRUCTURAL CAST-IN-PLACE CONCRETE FORMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Design, construction, and safety of formwork.
   2. Furnish and install required formwork ready for placing of concrete.
   3. Strip and dispose of formwork.

B. Related Requirements:.
   1. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   2. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   3. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   4. Section 03 3111: 'Normal Weight Structural Concrete'.
      a. Tolerances for placing normal weight structural concrete.
      b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

A. Association Publications:
   1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).

B. Definitions (Following are specifically referenced for testing):
   1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
   2. Approved: To authorize, endorse, validate, confirm, or agree to.
   3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
   4. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
      a. Inspection: Not required by code provisions but may be required by Contract Documents.
      b. Special Inspection: Required by code provisions and by Contract Documents.
      c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
      d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
   5. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
      a. Using term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as

"carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.

6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
7. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
8. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
9. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
10. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
11. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
12. Service Provider: Agency or firm qualified to perform required tests and inspections.
13. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
14. Special Inspection: See Inspection.
15. Special Inspector: Certified individual or firm that implements special inspection program for project.
16. Special Test: See Test.
17. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
    a. Test: Not required by code provisions but may be required by Contract Documents.
    b. Special Test: Required by code provisions and by Contract Documents.
18. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
19. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
20. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
   1. American Concrete Institute:
      a. ACI 318-08, 'Building Code Requirements for Structural Concrete and Commentary.'

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 03 3111.
   2. In addition to agenda items specified in Section 01 3100 and 03 3111, review following:
      a. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review frequency of testing and inspections.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Manufacturer Instructions:
      a. Printed application instructions for form release agents.

1.5 QUALITY ASSURANCE

A. Not used.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Forms: Wood, metal, or plastic as arranged by Contractor.
   1. Forming material shall be compatible with specified form release agents and with finish requirements for concrete to be left exposed or to receive a smooth rubbed finish.

2.2 ACCESSORIES

A. Form Release Agents:
   1. Unexposed Surfaces Only: Contractor's option.

B. Form Release / Finish Agent:
   1. Vertical, Exposed Surfaces or Unexposed Surfaces:
      a. Chemically acting type.
      b. Type Two Acceptable Products.
         1) Crete-Lease 727 or 20-VOC by Cresset Chemical Co, Weston, OH www.cresset.com.
         2) Clean Strip (J-1 or J-3 VOC) by Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
         3) E-Z Strip or DEBOND Form Coating by L & M Construction Chemicals, Omaha, NE www.lmcc.com.
         4) Q-2 by Unitex, Kansas City, MO www.unitex-chemicals.com.
         5) U S Spec SlicKote by U S Mix Products Co www.usspec.com.
         6) Duogard or Duogard II by W R Meadows, Elgin, IL www.wrmeadows.com.
         7) Equal as approved by Architect before use. See Section 01 6200.

C. Expansion / Contraction Joints:
   1. 1/2 inch (13 mm) thick.
   2. Manufactured commercial fiber type:
      a. Meet requirements of ASTM D1751.
      b. Type Two Acceptable Products:
         1) Conflex by Knight-Celotex, Northfield, IL www.aknightcompany.com.
         2) Sealtight by W R Meadows Inc, Hampshire, IL www.wrmeadows.com.
         3) Equal as approved by Architect before installation. See Section 01 6200.
   3. Recycled Vinyl:
      a. Light gray color.
      b. Type Two Acceptable Products:
         1) Proflex by Oscoda Plastics Inc, Oscoda, MI www.oscodaplastics.com.
         2) Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Forms:
   1. Assemble forms so forms are sufficiently tight to prevent leakage.
   2. Properly brace and tie forms.

3. Make proper form adjustments before, during, and after concreting.
4. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition. Use APA Plyform B-B Class I, or APA HDO Plyform B-B Class I, on exposed to view concrete that do not receive a smooth rubbed finish..
5. Use metal cold joint forms when unable to place concrete for footings, foundations, and slabs in continuous pours.

B. Accessories:
1. General:
   a. Provide for installation of inserts, templates, fastening devices, sleeves, and other accessories to be set in concrete before placing.
   b. Position anchor bolts for hold-down anchors and columns and securely tie in place before placing concrete.
2. Form Release / Finish Agents:
   a. Film thickness shall be no thicker than as recommended by Manufacturer.
   b. Allow no release / finish agent on reinforcing steel or footings.
3. Expansion Joints:
   a. Install at joints between floor slab and foundation wall where shown on Drawings.

C. Form Removal:
1. Removal of forms can usually be accomplished in twelve (12) to twenty four (24) hours.
2. If temperature is below 50 deg F (10 deg C) or if concrete (stairs, beams, etc) depends on forms for structural support, leave forms intact for sufficient period for concrete to reach adequate strength.
3. For exposed to view surfaces that receive a smooth rubbed finish, remove forms while concrete is still “green”.
4. Metal bars or prys should not be used. Use wood wedges, tapping gradually when necessary.

3.2 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Concrete Formwork:
   a. Inspections are not required and will be performed at discretion of Architect.

END OF SECTION

SECTION 03 3111

NORMAL WEIGHT STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install Project concrete work as described in Contract Documents.
   2. Quality of concrete used on Project but furnished under other Sections.

B. Products Installed But Not Furnished Under This Section:
   1. Inserts, bolts, boxes, templates, and fastening devices for other work, including those for bases only for Mechanical and Electrical.
   2. Concrete accessories.

C. Related Requirements:
   1. Pre-installation conference held jointly with Section 31 3111 as described in Administrative Requirements on Part 1 of this specification section.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 7800: 'Closeout Submittals'.
   7. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
   8. Section 31 1123: Aggregate base under miscellaneous cast-in-place concrete and exterior slabs, under interior slabs-on-grade concrete, and asphalt paving.
   9. Section 31 2316: Excavation
   10. Section 31 2323: Compaction procedures and tolerances.
   11. Furnishing of items to be embedded in concrete specified in Section involved.

1.2 REFERENCES

A. Association Publications
   1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 224R-01, *Control of Cracking in Concrete Structures'* (Reapproved 2008).
      b. ACI 224.1R-07, *Causes, Evaluation, and Repair of Cracks in Concrete Structures'* (March 1, 2007).
      c. ACI 224.2R-92: *Cracking of Concrete Members in Direct Tension'* (Reapproved 2004).
      d. ACI 224.3R-95, *Joints in Concrete Construction'* (Reapproved 2008).
      e. ACI 302.1R-04: *Guide for Concrete Floor and Slab Construction'* (March 23, 2004).
      f. ACI 302.2R-06, '*Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials'* (August 15, 2006).
      g. ACI CP-1-12, 'Technical Workbook for ACI Certification of Concrete Field Testing Technician – Grade 1'.
      h. ACI Flatwork Finisher Certification Program.
      i. ACI Field Technician Certification Program.
      j. SP-204-01, 'Design and Construction Practices to Mitigate Cracking'.
      k. SP-231R-10, 'Report on Early-Age Cracking: Causes, Measurement and Mitigation'.

2. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
3. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
4. International Code Council (IBC):
   a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions (Following are specifically referenced for testing):
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Approved: To authorize, endorse, validate, confirm, or agree to.
3. Cementitious Materials: Portland cement alone or in combination with one or more of following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.
4. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
5. Floor Flatness (FF): Rate of change in elevation of floor over a 12 inches (305 mm) section.
6. Floor Levelness (FL): Measures difference in elevation between two points which are 10 feet (3.05 m) apart.
7. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
   a. Inspection: Not required by code provisions but may be required by Contract Documents.
   b. Special Inspection: Required by code provisions and by Contract Documents.
   c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
8. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
9. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
10. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
11. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
12. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
13. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
14. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
15. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.

16. Service Provider: Agency or firm qualified to perform required tests and inspections.
17. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
18. Special Inspection: See Inspection.
19. Special Inspector: Certified individual or firm that implements special inspection program for project.
20. Special Test: See Test.
21. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
    a. Test: Not required by code provisions but may be required by Contract Documents.
    b. Special Test: Required by code provisions and by Contract Documents.
22. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
23. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
24. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
1. American Association of State and Highway Transportation Officials:
    a. AASHTO M 153-06, 'Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction'.
    b. AASHTO M 213-01 (2010), 'Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)'.
    c. AASHTO T 318-02, 'Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying'.
2. American Concrete Institute:
    a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
    b. ACI 301-10, 'Specification for Structural Concrete'.
    c. ACI 318-08, 'Building Code Requirements for Structural Concrete and Commentary'.
3. ASTM International:
    a. ASTM A615/A615M-09b, 'Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement'.
    b. ASTM C31/C31M-10, 'Standard Practice for Making and Curing Concrete Test Specimens in the Field'.
    c. ASTM C33/C33M-11a, 'Standard Specification for Concrete Aggregates'.
    d. ASTM C39/C39M-11a, 'Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens'.
    e. ASTM C42/C42M-11, 'Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
    f. ASTM C94/C94M-11b, 'Standard Specification for Ready-Mixed Concrete'.
    g. ASTM C140-11, 'Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units'.
    h. ASTM C143/C143M-10a, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
    i. ASTM C150/C150M-11, 'Standard Specification for Portland Cement'.
    j. ASTM C171-07, 'Standard Specification for Sheet Materials for Curing Concrete'.
    k. ASTM C172/C172M-10, 'Standard Practice for Sampling Freshly Mixed Concrete'.
    l. ASTM C173/C173M-10b, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method'.
    m. ASTM C192/C192M-07, 'Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory'.
    n. ASTM C231/C231M-10, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method'.
    o. ASTM C260/C260M-10, 'Standard Specification for Air-Entraining Admixtures for Concrete'.
    p. ASTM C494/C494M-11, 'Standard Specification for Chemical Admixtures for Concrete.
    q. ASTM C567-05a, 'Standard Test Method for Determining Density of Structural Lightweight Concrete'.

r. ASTM C595/C595M-11, ‘Standard Specification for Blended Hydraulic Cements'.
s. ASTM C597-09, ‘Standard Test Method for Pulse Velocity Through Concrete'.
t. ASTM C618-08a, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
u. ASTM C803/C803M-03(2010), ‘Standard Test Method for Penetration Resistance of Hardened Concrete'.
v. ASTM C805/C805M-08, ‘Standard Test Method for Rebound Number of Hardened Concrete'.
w. ASTM C989-10, ‘Standard Specification for Slag Cement for use in Concrete and Mortars'.
x. ASTM C1077-11b, 'Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation'.
y. ASTM C1157/C1157M-11, ‘Standard Performance Specification for Hydraulic Cement'.
z. ASTM C1688/C1688M-10a, ‘Standard Test Method for Density and Void Content of Freshly Mixed Pervious Concrete’.
aa. ASTM D1751-04(2008), 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)'.
bb. ASTM D1752-04a(2008), ‘Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction'.
cc. ASTM D3666-09a, ‘Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.
dd. ASTM E329-11b: ‘Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
ee. ASTM E543-09, ‘Standard Specification for Agencies Performing Nondestructive Testing'.
ff. ASTM E1155-96(2008), 'Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers’.
gg. ASTM E1212-09, ‘Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
hh. ASTM F710-11, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
ii. ASTM F2170-11, ‘Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
1. Participate in pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
   a. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
   b. Section 03 2100: ‘Reinforcement Bars’.
   c. Section 03 2116: ‘Epoxy-Coated Reinforcement Steel Bars'.
   d. Section 03 3053: 'Miscellaneous Exterior Cast-In-Place Concrete'.
2. In addition to agenda items specified in Section 01 3100, review following:
   a. Installation scheduling, coordination, placement of concrete, and placement of items installed in and under floor slab.
   b. Review requirements for preparation of subgrade.
   c. Review aggregate base requirements.
   d. Review formwork requirements.
   e. Review approved mix design requirements and use of admixtures.
   f. Review reinforcing steel submittals.
   g. Review placement, finishing, and curing of concrete including cold and hot weather requirements.
   h. Review jointing requirements and joint layout.
   i. Review concrete slab tolerances and corrective measures if tolerances not met.
   j. Review safety issues.
   k. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.

1) Review frequency of testing and inspections.

B. Scheduling:
1. Notify Testing Agency and Architect twenty four (24) hours minimum before placing concrete.

1.4 SUBMITTALS

B. Informational Submittals:
1. Certificates:
a. Installers:
1) Certification for National Ready Mixed Concrete Association (NRMCA).
2) Certification for ACI-certified Flatwork Finishers and Technicians.
2. Design Data:
a. Mix Design:
1) Furnish proposed mix design to Architect for review prior to commencement of Work.
a) Include density (unit weight) and void content determined per ASTM C1688/C1688M for fresh mixed properties and per ASTM C140 for hardened concrete properties.
b) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use.
b. Ready-Mix Supplier:
1) Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or his representatives. Tickets shall show following:
a) Name of ready-mix batch plant.
b) Serial number of ticket.
c) Date and truck number.
d) Name of Contractor.
e) Name and location of Project.
f) Specific class or designation of concrete conforming to that used in Contract Documents.
g) Amount of concrete.
h) Amount and type of cement.
i) Total water content allowed by mix design.
j) Amount of water added at plant.
k) Sizes and weights of sand and aggregate.
l) Time loaded.
m) Type, name, manufacturer, and amount of admixtures used.
n) Design Data.
2) Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
a) Cement.
b) Aggregate.
c) Fly Ash.
3. Source Quality Control Submittals:
a. Concrete mix design: Submit mix designs to meet following requirements:
1) Proportions:
a) Mix Type D (also to be used for exterior concrete subject to freeze thaw conditions):
(1) 4500 psi (31.03 MPa) minimum at twenty eight (28) days.
(2) Water / Cement Ratio: 0.45 maximum by weight.
b) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for Exterior Concrete and foundation walls exposed to freeze thaw conditions.
c) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
2) Slump:

a) 4 inch (100 mm) slump maximum before addition of high range water reducer.
b) 8 inch (200 mm) slump maximum with use of high range water reducer.
c) Slump not required for Mix Type F.

3) Admixtures:
a) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use. Do not use any admixture without Architect's written approval.
b) Mineral: An amount of specified fly ash not to exceed twenty (20) percent of weight of cement may be substituted for cement. If substituted, consider fly ash with cement in determining amount of water necessary to provide specified water / cement ratio.
c) Chemical: Specified accelerator or retarder may be used if necessary to meet environmental conditions.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Pour Reports:
a) Provide report that records following information:
b) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
c) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
d) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
e) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
f) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
g) Screeding method and equipment used.
h) Saw cut method and equipment used.
2) Testing and Inspection Reports:
a) Testing Agency Testing and Inspecting Reports of concrete.

1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
1. Installers and Installation Supervisor:
a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
2. Ready-Mix Supplier:
a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.
3. Testing Agencies:
a. Independent agency qualified according to ASTM C1077 and ASTM E329.
1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.

B. Testing and Inspection:
1. Owner will provide Testing and Inspection on concrete:
a. See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Expansion Filler Material:
      a. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage And Handling Requirements:
   1. Expansion Filler Material:
      a. Store materials in a clean, dry area in accordance with manufacturer's instructions.
      b. Protect materials during handling and application to prevent damage.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. BASF Admixtures, Cleveland, OH www.basf-admixtures.com.
      b. Bonsal American, Charlotte, NC www.bonsal.com.
      c. Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
      d. Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
      e. Fritz-Pak Concrete Admixtures, Dallas, TX www.fritzpak.com.
      f. Grace Construction Products, Cambridge, MA www.graceconstruction.com and Grace Canada Inc, Ajax, ON (905) 683-8561.
      g. L & M Construction Chemicals, Omaha, NE www.lmcc.com.
      h. Larsen Weldcrete by Larsen Products Corp, Rockville, MD www.larsenproducts.com.
      i. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com and Sika Canada, Pointe Claire, QC www.sika.ca.
      j. Sonneborn / BASF Building Systems, Shakopee, MN www.chemrex.com.
      k. Unitex, Kansas City, MO www.unitex-chemicals.com.
      l. U S Mix Products Co, Denver, CO www.usspec.com.
      m. W R Meadows, Hampshire, IL www.wrmeadows.com.

B. Performance:
   1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise.
      a. Floor Slab for interior concrete slabs:
         1) Class 1 Floor:
            a) Anticipated type of traffic: exposed surface – foot traffic.
            b) Special considerations: Uniform finish, nonslip aggregated in specific areas, curing.
            c) Final finish: Normal steel-troweled finish, nonslip finish where required.
   2. Capacities:
      a. For testing purposes, following concrete strengths are required:
         1) At 7 days: 60 percent minimum of 28 day strengths.
         2) At 28 days: 100 percent minimum of 28 day strengths.
         3) At 28 days:
            a) Mix Type D: 4500 psi (31 MPa).

C. Materials:
   1. Table One:

Portland Cement / Blended Hydraulic Cement Equivalencies		
ASTM C150/C150M (Low Alkali)	ASTM C595/C595M	ASTM C1157/C1157M
Type I	IP	GU

Type II	IP (MS)	MS
Type III		HE
Type V		HS

2. Hydraulic Cement: Meet requirements of ASTM C150/C150M, Type I/II.
3. Aggregates:
   a. Coarse:
      1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
      2) Aggregate shall be uniformly graded by weight as follows:

         a) Table Two: Flat Work, Size No. 67.

Sieve	Percent Passing	Sieve	Percent Passing
One Inch	100	25 mm	100
3/4 Inch	90 - 100	19 mm	90 - 100
3/8 Inch	20 - 55	9 mm	20 - 55
No. 4	0 - 10	4.75 mm	0 - 10
No. 8	0 - 5	2.36 mm	0 - 5

         b) Table Three: All Other, Size No. 57.

Sieve	Percent Passing	Sieve	Percent Passing
1-1/2 Inch	100	38 mm	100
One Inch	95 - 100	25 mm	95 - 100
1/2 Inch	25 - 60	12 nm	25 - 60
No. 4	0 - 10	4.75 mm	0 - 10
No. 8	0 - 5	2.36 mm	0 - 5

   b. Fine:
      1) Meet requirements of ASTM C33/C33M.
      2) Aggregate shall be uniformly graded by weight as follows:

         a) Table Four:

Sieve	Percent Passing	Sieve	Percent Passing
3/8 Inch	100	9 mm	100
No. 4	95 - 100	4.75 mm	95 - 100
No. 8	80 - 100	2.36 mm	80 - 100
No. 16	50 - 85	1.18 mm	50 - 85
No. 30	25 - 60	0.60 mm	25 - 60
No. 50	10 - 30	0.30 mm	10 - 30
No. 100	2 - 10	0.15 mm	2 - 10

4. Water: Clear, apparently clean, and potable.
5. Admixtures And Miscellaneous:
   a. Mineral:
      1) Fly Ash Pozzolan: Meet requirements of ASTM C618, Class F or C and with loss on ignition (LOI) of three (3) percent maximum.
   b. Chemical:
      1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
      2) Air Entraining Admixture:
         a) Meet requirements of ASTM C260/C260M.
         b) Type Two Acceptable Products:
            (1) MB-VR, MB-AE or Micro Air by BASF.
            (2) Air Mix 200 Series or AEA-92 Series by Euclid.

(3) Air Plus or Super Air Plus by Fritz-Pak.
(4) Sika Air by Sika.
(5) Daravair or Darex Series AEA by W R Grace.
(6) Equal as approved by Architect before use. See Section 01 6200.

3) Water Reducing Admixture:
   a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
   b) Type Two Acceptable Products:
      (1) Pozzolith Series by BASF.
      (2) Eucon WR 75 or Eucon 91 by Euclid.
      (3) FR-2 or FR-3 by Fritz-Pak.
      (4) Plastocrete 160 by Sika.
      (5) Daracem, WRDA, or MIRA Series by W R Grace.
      (6) Equal as approved by Architect before use. See Section 01 6200.
4) Water Reducing, Retarding Admixture:
   a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.
   b) Type Two Acceptable Products:
      (1) Pozzolith Series by BASF.
      (2) Eucon Retarder 75 by Euclid.
      (3) FR-1 or Modified FR-1 by Fritz-Pak.
      (4) Plastiment by Sika.
      (5) Daratard Series or Recover by W R Grace.
      (6) Equal as approved by Architect before use. See Section 01 6200.
5) High Range Water Reducing Admixture (Superplasticizer):
   a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
   b) Type Two Acceptable Products:
      (1) Rheobuild 1000 or Glenium Series by BASF.
      (2) Eucon 37 or Eucon 537 by Euclid.
      (3) Supercizer 1 through 7 by Fritz-Pak.
      (4) Sikament 300 by Sika.
      (5) Daracem or ADVA Series by W R Grace.
      (6) Equal as approved by Architect before use. See Section 01 6200.
6) Non-Chloride, Non-Corrosive Accelerating Admixture:
   a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
   b) Type Two Acceptable Products:
      (1) Accelguard 80 by Euclid.
      (2) Pozzolith NC 534 or 122HE or Pozzutec 20+.
      (3) Daraset, Polarset or Lubricon by W R Grace.
      (4) Equal as approved by Architect before use. See Section 01 6200.
7) Corrosion Inhibiting Admixture:
   a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
   b) Type Two Acceptable Products:
      (1) Eucon CIA by Euclid.
      (2) DCI or DCI-S by W R Grace.
      (3) Equal as approved by Architect before use. See Section 01 6200.
8) Alkali-Silica Reactivity Inhibiting Admixture:
   a) Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
   b) Type Two Acceptable Products:
      (1) Eucon Integral ARC by Euclid.
      (2) RASIR by W R Grace.

(3) Equal as approved by Architect before use. See Section 01 6200.

9) Viscosity Modifying Admixture (VMA):
   a) Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendation.
   b) Type Two Acceptable Products:
      (1) Visctrol by Euclid.
      (2) VMAR3 by W R Grace.
      (3) Equal as approved by Architect before use. See Section 01 6200.
10) Shrinkage Reducing Admixture (SRA):
   a) Liquid admixture specifically designed to reduce drying shrinkage and potential for cracking.
   b) Type Two Acceptable Products:
      (1) Eucon SRA by Euclid.
      (2) Eclipse 4500 (exterior concrete) by W R Grace.
      (3) Eclipse Floor 200 (interior concrete) by W R Grace.
      (4) Equal as approved by Architect before use. See Section 01 6200.

2.2 ACCESSORIES

A. Bonding Agents:
   1. Type Two Acceptable Products:
      a. Acrylic Additive by Bonsal American.
      b. Day Chem Ad Bond (J-40) by Dayton Superior.
      c. Flex-Con by Euclid Chemical Co.
      d. Larsen Weldcrete by Larsen Products Corp.
      e. Everbond by L & M Construction Chemicals.
      f. Acryl Set by BASF.
      g. Sonocrete by Sonneborn.
      h. U S Spec Multicoat by U S Mix Products.
      i. Intralok by W R Meadows.
      j. Equal as approved by Architect before use. See Section 01 6200.

B. Evaporation Retardant:
   1. Type Two Acceptable Products:
      a. Confilm by BASF.
      b. Sure Film J-74 by Dayton Superior.
      c. Eucobar By Euclid Chemical Co.
      d. E-Con by L & M Construction Chemicals.
      e. Pro Film by Unitex.
      f. U S Spec Monofilm ER by U S Mix Products.
      g. Equal as approved by Architect before use. See Section 01 6200.

C. Expansion Filler Material:.
   1. Expansion Filler Material:
      a. Design Criteria:
         1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751 and AASHTO M-213.
         2) 1/2 inch (12.7 mm) thick.
         3) Resilience:
            a) When compressed to half of original thickness, recover to minimum of 70 percent of original thickness.
      b. Type Two Acceptable Products:
         1) Fiber Expansion Joint by W R Meadows, Hampshire, IL www.wrmeadows.com.
         2) Equal as approved by Architect before installation. See Section 01 6200.
   2. Recycled PVC Joint Filler:
      a. Design Criteria:

1) Expansion joint filler manufactured from 100 percent recycled vinyl material meeting requirements of ASTM D1752 and AASHTO M-153.
2) 1/2 inch (12.7 mm) thick.
3) Compressive/Recovery:
   a) Meet requirements for ASTM D1752 recover minimum of 90 percent of original thickness.
4) Light gray color.

b. Type One Approved Products:
1) Proflex by Oscoda Plastics Inc, Oscoda, MI www.oscodaplastics.com.
2) Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation:
1. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
2. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section.
   a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.

B. Removal:
1. Remove water and debris from space to be placed.

3.2 INSTALLATION

A. Special Techniques:
1. Cold Weather Concreting Procedures:
   a. General Requirements:
      1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
      2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
      3) Thaw sub-grade 6 inches (150 mm) deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
      4) Use no frozen materials or materials containing ice.
   b. Requirements When Average twenty four (24) Hour Temperature, midnight to midnight, Is Below 40 deg F (4 deg C):
      1) Temperature of concrete as placed and maintained shall be 55 deg F (13 deg C) minimum and 75 deg F (27 deg C) maximum.
      2) Heat concrete for seventy two (72) hours minimum after placing if regular cement is used; for 48 hours if high early strength cement is used; or longer if determined necessary by Architect.
         a) During this period, maintain concrete surface temperature between 55 and 75 deg F (13 and 27 deg C).
      3) Vent flue gases from combustion heating units to outside of enclosure to prevent carbonation of concrete surface.
      4) Prevent concrete from drying during heating period. Maintain housing, insulation, covering, and other protection twenty four (24) hours after heat is discontinued.
      5) After heating period, if temperature falls below 32 deg F (0 deg C), protect concrete from freezing until strength of 2000 psi (13.79 MPa) minimum is achieved.

a) Protect flatwork exposed to melting snow or rain during day and freezing during night from freezing until strength of 3500 psi (24.13 MPa) minimum is achieved.

c. Requirements When Average twenty four (24) Hour Temperature, midnight to midnight, Is Above 40 deg F (4 deg C), but when temperature falls below 32 deg F (0 deg C):
   1) Protect concrete from freezing for seventy two (72) hours after placing, or until strength of 2000 psi (13.79 MPa) is achieved, whichever is longer.
   2) Protect flatwork exposed to melting snow or rain during day and freezing during night from freezing until strength of 3500 psi (24.13 MPa) minimum is achieved.

d. Protect soil supporting concrete footings from freezing under any circumstances.

2. Hot Weather Concreting Procedures:
   a. Maximum concrete temperature allowed is 90 deg F (32 deg C) in hot weather.
   b. Cool aggregate and subgrades by sprinkling.
   c. Avoid cement over 140 deg F (60 deg C).
   d. Use cold mixing water or ice.
   e. Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.

B. Tolerances:
1. Tolerances shall conform to requirements of ACI 117 or CSA A23.1, except where specified differently:
   a. Floor test surfaces shall be measured and reported within seventy two (72) hours after completion of slab concrete finishing operations and before removal of any supporting shores to eliminate any curling effect F-numbers.
2. Local Flatness / Levelness of Slabs:
   a. Specified Overall Value of F_F30 / F_L24 and Minimum Local Value of F_F20 / F_L15 when tested in accordance with ASTM E1155.
   b. Table Five: Maximum Variation Tolerances.

Thickness, standard	plus 3/8 inch, minus 1/4 inch	plus 9.5 mm, minus 3 mm
Thickness, footings	minus 0 inch	minus 0 mm
Plan, 0 - 20 feet	1/2 inch	12.7 mm
Plan, 40 feet or greater	3/4 inch	19 mm
Plan, footings	plus 1/2 inch	plus 12.7 mm
Eccentricity, footings	2 inch max standard, 1/2 inch at masonry	50 mm max standard, 12.7 mm at masonry
Openings, size	minus 1/4 inch, plus One inch	minus 6 mm, plus 25.4 mm
Openings, location	plus / minus 1/2 inch at center	plus / minus 12.7 mm at center
Plumb	1/2 inch max	12.7 mm max
Consecutive Steps, treads	1/4 inch	6 mm
Consecutive Steps, risers	1/8 inch	3 mm
Flight of Stairs, treads	1/4 inch in total run	6 mm in total run
Flight of Stairs, risers	1/8 inch in total height	3 mm in total height

C. Placing:
1. General:
   a. Place as soon after mixing as possible.
   b. Deposit as nearly as possible in final position.
   c. Placing of concrete shall be continuous until panel or section is complete.
   d. In order to avoid overloading of forms and ties, observe following rate of filling for various air temperatures:
      1) Table Six: Placing Rate.

Temperature	Rate of Fill per Hour	Temperature	Rate of Fill per Hour
40 deg F	2 feet	4 deg C	600 mm
50 deg F	3 feet	10 deg C	900 mm
60 deg F	4 feet	16 deg C	1 200 mm
70 deg F	5 feet	21 deg C	1 500 mm

e. Compact concrete in forms by vibrating and other means where required.
   1) Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type F).
f. Consolidate concrete thoroughly.
g. Do not embed aluminum in concrete.
h. Do not use contaminated, deteriorated, or re-tempered concrete.
i. Avoid accumulation of hardened concrete.

2. Footings:
   a. Bear 12 inches (300 mm) minimum into undisturbed earth or on mechanically compacted engineered fill. Step footings at ratio of 1-1/2 horizontal to One vertical unless detailed otherwise. Exterior wall footing shall bear 30" minimum below finish grades.
   b. Level top of finish footing and leave rough.
   c. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches (1 200 mm) long.
3. Foundations And Walls: Leave steel projecting where required for floor tie.
4. Exterior Slabs:
   a. Dusting with cement not permitted.
   b. For continuous placing and where shown on Drawings, saw cut one inch deep control joints before shrinkage occurs (2 inches at 6 inches slabs) (50 mm at 150 mm slabs).
5. Equipment Bases: Coordinate with appropriate Sections for locations and dimensions.
6. Joints:
   a. Where possible, locate joints under partitions or where joints will cause least disruption to floor coverings.
   b. Construction Joints: Locate where shown on Drawings to least impair strength of completed structure. Construction joints in foundation walls shall not occur within 6 feet (1.80 meters) of corner and be keyed.
7. Bonding Fresh And Hardened Concrete:
   a. Re-tighten forms.
   b. Roughen surfaces.
   c. Clean off foreign matter and laitance.
   d. Wet but do not saturate.
   e. Slush with neat cement grout or apply bonding agent.
   f. Proceed with placing new concrete.
8. Anchor Bolts:
   a. Place anchor bolts not tied to reinforcing steel immediately following leveling of concrete. Reconsolidate concrete around bolt immediately after placing bolt.
   b. Do not disturb bolts during finishing process.

D. Finishing:
1. Rubbed Finish, Exposed Vertical Surfaces:
   a. Smooth Rubbed Finish shall be as specified in Section 03 3053.
2. Broom Finishes, Exterior Flatwork Not Specified in Section 03 3053:
   a. Broom finish exterior slabs.
   b. Round edges including edges formed by expansion joints.
   c. Remove edger marks.

3.3 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Concrete:
   a. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
   b. Testing Agency will sample and test for quality control during placement of concrete as directed by Architect.
   c. Testing and inspections, if performed, will include following:
      1) Periodic inspection verifying use of required design mix.
      2) Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.

3) Inspection of concrete placement for proper application techniques.
4) Periodic inspection for maintenance of specified curing temperature and techniques.
5) Periodic inspect of formwork for shape, location and dimensions of concrete member being formed:
   a) Certified Inspector shall inspect forms for general location, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, and form tie locations.
6) Concrete moisture and alkalinity testing. See Section 09 0503 Flooring Substrate Preparation.

d. Testing Agency will sample and test during placement of concrete as directed by Architect and may include following:
   1) Sampling Fresh Concrete: ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M:
      a) Slump: ASTM C143/C143M, Test each time set of compressive specimens are made.
      b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight concrete each time set of compression test specimens are made.
      c) Concrete Temperature: Test each time set of compressive specimens are made.
      d) Unit Weight: ASTM C567, Test each time set of compressive specimens are made.

e. Compression Test Specimen: ASTM C31/C31M, one (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

f. Compressive Strength Tests: ASTM C39/C39M:
   1) Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd (4 cu m), but less than 50 cu. yd (38 cu m), plus one (1) set for each additional 50 cu. yd (38 cu m) or fraction thereof.
   2) One (1) specimen tested at at seven (7) days, two (2) specimens tested at twenty eight (28) days, and one (1) specimen retained in reserve for later testing if required.
   3) If strength of field-cured cylinders is less than eighty five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
   4) Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi (3.45 MPa).

2. Reinforcement Bars and Bolts:
   a. Inspections will include following:
      1) Bolts:
         a) Inspection of bolts to be installed in concrete prior to and during placement of concrete.
         b) Periodic inspection of anchors installed in hardened concrete.
      2) Reinforcement Bars:
         a) Periodic inspection of reinforcement bars and placement prior to concrete placement to verify grade, size, cover, spacing, and position of reinforcing.
         b) Inspect that all reinforcement bars are be positively identified as to heat number and mill analysis.
         c) Confirm surface of reinforcing bars is free of form release oil or other deleterious substances.

3.4 PROTECTION

A. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.

B. Do not allow materials resulting from construction activities, which will affect concrete or application of finish floor systems adversely, to come in contact with interior concrete slabs.

C. Protect interior concrete floors from stains, paint, mortar and other construction activities.

END OF SECTION

B L A N K P A G E

SECTION 04 0513

CEMENT AND LIME MASONRY MORTARING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of masonry mortar used on Project.

B. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   3. Sections Under 04 2000 Heading: Furnish and install mortar.

1.2 REFERENCES

A. Definitions:
   1. Mortar: Plastic mixture of cementitious materials, fine aggregate and water. See ASTM C270.

B. Reference Standards:
   1. ASTM International:
      a. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar.'
      b. ASTM C150/C150M-11, 'Standard Specification for Portland Cement.'
      c. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes.'
      d. ASTM C270-10, 'Standard Specification for Mortar for Unit Masonry'.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Source Quality Control Submittals:
      a. If pre-mixed wet mortar or pre-blended dry mortar mix are to be used, provide certification from Manufacturer or Supplier verifying that mixes meet specification requirements.
      b. If site mixed / blended mortar is to be used, provide written description of proposed method of measuring and mixing of materials.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Performance:
   1. Minimum Compressive Strength at 28 Days:
      a. Type N: 750 psi (5.17 MPa).

B. Materials:
   1. Portland Cement:
      a. Meet requirements of ASTM C150, Type II Low Alkali unless approved otherwise in writing by Architect.

SECTION 04 0513

CEMENT AND LIME MASONRY MORTARING

PART 1 - GENERAL

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   1. Quality of masonry mortar used on Project.

B. Related Requirements:
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A. Definitions:
   1. Mortar: Plastic mixture of cementitious materials, fine aggregate and water. See ASTM C270.

B. Reference Standards:
   1. ASTM International:
      a. ASTM C144-11, 'Standard Specification for Aggregate for Masonry Mortar.'
      b. ASTM C150/C150M-11, 'Standard Specification for Portland Cement.'
      c. ASTM C207-06(2011), 'Standard Specification for Hydrated Lime for Masonry Purposes.'
      d. ASTM C270-10, 'Standard Specification for Mortar for Unit Masonry'.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Source Quality Control Submittals:
      a. If pre-mixed wet mortar or pre-blended dry mortar mix are to be used, provide certification from Manufacturer or Supplier verifying that mixes meet specification requirements.
      b. If site mixed / blended mortar is to be used, provide written description of proposed method of measuring and mixing of materials.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Performance:
   1. Minimum Compressive Strength at 28 Days:
      a. Type N: 750 psi (5.17 MPa).

B. Materials:
   1. Portland Cement:
      a. Meet requirements of ASTM C150, Type II Low Alkali unless approved otherwise in writing by Architect.

2. Hydrated Lime:
   a. Meet requirements of ASTM C207, Type S.
3. Aggregate:
   a. Standard Mortar:
      1) Natural or manufactured sand meeting requirements of ASTM C144 and following:
         a) Fineness modulus: 1.6 to 2.5 percent
         b) Water demand, ratio by weight: 0.65 percent maximum
         c) Grading:

Sieve	Sieve	Percent Passing	
		Natural Sand	Manufactured Sand
No. 4	4.750 mm	100	100
No. 8	2 360 mm	95 to 100	95 to 100
No. 16	1.191 mm	70 to 100	70 to 100
No. 30	0.594 mm	40 to 75	40 to 75
No. 50	0.297 mm	10 to 35	20 to 40
No. 100	0.150 mm	2 to 15	10 to 25
No. 200	0.075 mm	none	0 to 10

      2) Grading requirements for pointing mortar:

Sieve	Sieve	Percent Passing	
		Natural Sand	Manufactured Sand
No. 16	1.191 mm	100	100
No. 30	0.594 mm	40 to 75	40 to 75
No. 50	0.297 mm	10 to 35	20 to 40
No. 100	0.150 mm	2 to 15	10 to 25
No. 200	0.075 mm	none	0 to 10

4. Water:
   a. Clean and free of acids, alkalis, and organic materials.
5. Admixtures:
   a. Use no admixtures, except for color pigments specified below, without Architect's written permission. Use of any admixture to meet cold weather requirements and admixtures that increase air entrainment are expressly forbidden under all circumstances.
6. Mortar Color Pigment:
   a. High purity, chemically inert, unfading, alkali-fast mineral oxides, finely ground and especially prepared for mortar.
   b. Color Standard: Match existing.
   c. Type One Acceptable Products:
      1) True Tone Mortar Colors by Davis Colors, Los Angeles, CA www.daviscolors.com.
      2) SGS Mortar Colors by Solomon Colors, Springfield, IL www.solomoncolors.com.
      3) Equal as approved by Architect before bidding. See Section 01 6200.

C. Mixes:
1. General:
   a. Heat water and sand to 140 deg F (60 deg C) maximum if temperature is below 40 deg F (4 deg C).
2. Unit Masonry Mortar: Type 'N'
   a. Parts by Volume:
      Portland Cement 1
      Hydrated Lime 1
      Damp Loose Sand: 2-1/4 minimum to three maximum, times sum of volumes of cement and lime used. Maintain sand piles in damp, loose condition.
   b. Parts by Weight:

Portland Cement	94 lbs	43 kg
Hydrated Lime	40 lbs	18 kg
Dry Sand	360 lbs min. to 480 lbs max.	163 kg min. to 218 kg max.

PART 3 - EXECUTION: Not Used

END OF SECTION

B L A N K P A G E

SECTION 04 0521

MASONRY VENEER TIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Ties for veneering masonry on framed walls.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Manufacturer Contact Information:
      a. Heckman Building Products Inc, Chicago, IL www.heckmannbuildingprods.com.
      b. Hohmann & Barnard, Hauppauge, NY www.h-b.com.
      c. Masonry Reinforcing Corporation of America, Charlotte, NC www.wirebond.com.

B. Unit Masonry Over Framing:
   1. Brick Ties:
      a. Class One Quality Standard:
         1) HB 200 Adjustable Veneer Anchor by Hohmann & Barnard.
            a) Finish: Hot dipped galvanized.
            b) Accommodate 0 inch to 4 inch 0.00 inches (0.00 mm to 100mm) insulation thickness.
         2) Equal from Heckman and Masonry Reinforcing. See Section 01 6200.
   2. Fasteners:
      a. Class Two Quality Standards. See Section 01 6200:
         1) Steel Framing: Non-corrosive screws of length, type, and quantity recommended by Manufacturer.

PART 3 - EXECUTION: Not Used

END OF SECTION

B L A N K PA G E

SECTION 04 2113

BRICK VENEER MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install masonry units as veneer on framing as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Masonry Veneer Ties.

C. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance – Qualifications' for minimum qualification levels required.
   3. Section 01 7800: 'Closeout Submittals'.
   4. Sections Under 04 0000 Heading: Masonry:
      a. Pre-installation conference held jointly with other masonry related sections.
   5. Section 04 0513: Quality of mortar.
   6. Section 04 0521: Quality of masonry veneer ties.

1.2 REFERENCES

A. Association Publications:
   1. The Brick Industry Association Technical Notes on Brick Construction, 'Specifications for and Classification of Brick', October 2007 www.gobrick.com.

B. Definitions:
   1. Brick Classifications:
      a. Grade, class, type, application and use:
         1) Criteria for these classifications may include exposure or use conditions; appearance items; physical properties needed for performance; tolerances on dimensions and distortion; chippage; and void area.
         2) Brick qualify for particular classification based on their properties after manufacturing. While most brick can be manufactured to attain all attributes desired, certain attributes may be dictated by production method, durability classification or appearance classification designated by user:
            a) For example, molded brick cannot be made to meet classification for tightest dimensional tolerances since production method uses a higher percentage of water that may result in greater shrinkage.
            b) Brick manufactured by extrusion process can be made to meet classification for light or loose dimensional tolerances.
      b. Brick Color:
         1) There are no color-related tolerances in ASTM standards for brick. Standards are dictated by sample panel, mockups, or project specification.
      c. Brick Grade: Designation for durability and exposure:
         1) Brick is subjected to environmental and service conditions that vary. Brick is specified for its specific durability based on severity of weather and exposure and physical properties. Following are brick grades classifications based on the Weathering Index:
            a) SW: Severe weathering.
            b) MW: Moderate weathering.

c) NW: Negligible or no weathering.

2) Grade SW is stronger and more durable, and require less maintenance. Grade MW is less durable. Grade NW is least durable and should only be used for interior work.

d. Brick Type:

1) Limits include tolerances on dimensions, distortion, out-or-square and chippage. Appearance classification is established on size and precision attained in manufacturing. Following are brick types:

a) Type FBX: Brick for general use in masonry where higher degree of precision and lower permissible variation in size than permitted for Type FBS is required:

(1) Type FBX maintains strict requirements on absorption, waste, chipping, cracks, dimensions and distortion (warpage). Type FBX allows very narrow color range, minimal size variations, and uniform in appearance).

b) Type FBS: Brick for general use in masonry:

(1) Type FBS offer wider range of color and size variations, but lack of production controls results in many odd color lots.

c) Type FBA: Brick for general use in masonry selected to produce characteristic architectural effects resulting from non-uniformity in size and texture of individual units:

(1) Type FBA is used for aesthetic qualities. FBA have no limits for size and color variations.

2. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F (4 deg C) in twenty four (24) hour period.
3. Efflorescence: Deposit or encrustation of soluble salts, generally white and most commonly consisting of calcium sulfate that may form on surface of stone, brick, concrete, or mortar when moisture moves through and evaporates on masonry. Often caused by free alkalis leached from mortar, grout, adjacent concrete, or in clays. Test for efflorescence is described in ASTM C67 and CAN/CSA A82.
4. Facing Brick: Intended for use in both structural and nonstructural masonry, including veneer, where appearance is a requirement.
5. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F (38 deg C) or ambient air temperature above 90 deg F (32 deg C) with wind velocity 8 mph (13 kph) or greater.
6. Mortar: Plastic mixture of cementitious materials, fine aggregate and water (See ASTM C270 or ASTM C476).
7. Running Bond: Same as common bond, with continuous horizontal joints, but vertical joints are offset or in line. Bricks of each course are offset from the previous instead of being right on top of each other. If running bond is being used with modular brick, end of brick will be at mid-point of brick on course below. Running bond only requires minimal cutting at each end and will easily follow a gentle curve. Running bond method most used.
8. Solid Brick: Solid masonry unit of clay or shale, usually formed into rectangular prism while plastic and burned or fired in a kiln. Solid brick can have core holes whose area is no more than twenty five 25 percent of total bed surface of brick.
9. Veneer: Single wythe of masonry for facing purposes, not structurally bonded.
10. Warpage: Distortion of surfaces or edges of an individual brick from a plane surface or from straight line.
11. Weep Hole: Opening placed in mortar joints of facing material at level of flashing, to permit escape of moisture.

C. Reference Standards:

1. American Concrete Institute / American Society of Civil Engineers / The Masonry Society:
   a. ACI 530-05 / ASCE 5-05 / TMS 402-05, ‘Building Code Requirements for Masonry Structures'.
   b. ACI 530.1-05 / ASCE 6-05 / TMS 602-05, ‘Specification for Masonry Structures'.
   c. ACI 530-05 / ASCE 5-05 / TMS 402-05, ‘Commentary on Building Code Requirements for Masonry Structures'.
   d. ACI 530-01 / ASCE 6-05 / TMS 602-05, ‘Commentary on Specification for Masonry Structures'.
2. ASTM International:

a. ASTM C62-10, ‘Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
b. ASTM C67-11, ‘Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile’.
c. ASTM C216-11, 'Standard Specification for Facing Brick (Solid Masonry Made from Clay or Shale)'.
d. ASTM C270-10, ‘Standard Specification for Mortar for Unit Masonry’.
e. ASTM C476-10, ‘Standard Specification for Grout for Masonry’.
f. ASTM C652-11, ‘Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale)’.
g. ASTM C1232-10c, ‘Standard Terminology of Masonry’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
1. Participate in pre-installation conference held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conferences:
2. Schedule pre-installation conference during construction of mockup panel.
3. In addition to agenda items specified in Section 01 3100, review following:
a. Review storage and handling requirements.
b. Review cold and hot weather procedure requirements.
c. Review protection requirements.
d. Review masonry cleaning requirements.
e. Review clean up requirements.

1.4 SUBMITTALS

A. Action Submittals:
1. Samples:
a. One (1) full size brick minimum, one (1) sample of each special shape, and physical samples which demonstrate full range of color and texture.
b. Type of veneer tie used.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Manufacturers Documentation:
a) Manufacturer's literature or cut sheet.
b) Color and type selection.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
a. Minimum of five (5) years experience on successfully completed projects of similar nature.

1.6 DELIVERY, HANDLING, AND STORAGE

A. Delivery And Acceptance Requirements:
1. Check, carefully unload, and deliver material to site in such manner as to avoid soiling, damaging, or chipping.

B. Storage And Handling Requirements:

1. Masonry units:
   a. Store material on planks clear of ground and protect from damage, dirt, or disfigurement.
   b. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
2. Cementitious material:
   a. Store materials on elevated platforms, under cover, and in dry location.
   b. Do not use cementitious materials that have become damp.
3. Aggregates:
   a. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
4. Masonry accessories:
   a. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
   b. Protect from damage until installation.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Performance:
   1. Design Criteria:
      a. Face Brick: Meet requirements of ASTM C216.
         1) Grade SW.
         2) Type: FBX.
         3) Efflorescence:
            a) Provide brick that has been tested according to ASTM C67 and is rated 'Not Effloresced'.
         4) Initial rate of absorption: Less than 30 sq. in (30 g) per minute when tested per ASTM C67.
         5) Size:
            a) Match Existing
         6) Brick shall be free of defects, deficiencies, and surface treatments, including coatings that would interfere with proper setting of brick or significantly impair strength or performance of Work.
         7) Face or faces that will be exposed in place shall be free of chips that exceed limits set in ASTM C216 of five (5) percent for FBX. Aggregate length of chips shall not exceed ten (10) percent.
         8) Other than chips, face or faces shall be free of cracks or other imperfections detracting from appearance of designated sample when viewed from distance of 15 feet (4.6 meters) away. Number of brick in delivery that are broken or otherwise fail to meet requirements for chippage and tolerances shall not exceed five (5) percent.
      b. Brick shall be cleanable using standard method specified below when using specified mortar.

B. Materials:
   1. Mortar: Type 'N' as specified in Section 04 0513.
   2. Brick:
      a. Brick shall be true to size and shape. No warped brick permitted. Brick for Project shall be fired in same run.
      b. Field Brick: Match Existing
      c. Acceptable Manufacturers:
         1) Interstate Brick
         2) Equal as approved by Architect before bidding. See Section 01 6200.

2.2 ACCESSORIES

A. Cleaning Compounds:
   1. Use type of compound recommended by Brick Manufacturer based on minerals present in masonry units.
   2. Type Two Acceptable Products:
      a. 202 or 202V by Diedrich Technologies, Oak Creek, WI www.diedrichtechnologies.com.
      b. Surekleen No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS www.prosoco.com.
      c. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate and verify substrate is suitable for installation of masonry.
   2. Notify Architect of unsuitable conditions in writing.
      a. Do not install masonry over unsuitable conditions.
   3. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Special Techniques:
   1. Cold Weather Requirements:
      a. Do not lay masonry in Cold Weather unless authorized by Architect.
      b. Comply with cold-weather requirements contained in ACI 530.1/ASCE 6/TMS 602.
      c. Heat mixing water and sand as required during Cold Weather to produce mortar temperatures at application of between 70 and 120 deg F (21 and 49 deg C).
      d. Heat masonry units to 40 deg F (4 deg C) minimum when ambient temperature is below 20 deg F (minus 7 deg C).
      e. Provide windbreaks during construction if ambient temperature is 35 deg F (2 deg C) or below and wind velocities exceed 15 mph (24 kph).
      f. If ambient temperature is 20 deg F (minus 7 deg C) or below, provide enclosure for masonry under construction with heat sources and maintain temperature in enclosure at 40 deg F (4 deg C) minimum. Maintain temperature around masonry at 40 deg F (4 deg C) minimum for first 48 hrs after construction.
      g. Do not use frozen materials or materials mixed or coated with ice or frost. Keep materials free of ice and snow. Do not lay masonry on frozen material. Remove and replace unit masonry damaged by frost or by freezing conditions.
      h. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven (7) days after completing cleaning.
   2. Hot Weather Requirements:
      a. Comply with hot-weather requirements contained in ACI 530.1/ASCE 6/TMS 602.
      b. In Hot Weather, cool mixing water as necessary to maintain mortar and grout temperatures below 90 deg F (32 deg C).
      c. In Hot Weather, prevent rapid drying of walls by using fog spray or by covering wall with plastic or wet canvas or burlap.
   3. Repair brick units and repoint mortar joints only when air temperature is beween 40 deg F (4 deg C) and 90 deg F (32 deg C) and is predicted to remain so for at least seven (7) days after completion of the Work unless otherwise indicated.

B. Interface With Other Work:

1. Make cuts proper size to accommodate work of other trades. Cut openings for electrical devices using cover plates no larger than can be covered by standard size plate.
2. Replace unit masonry in which larger than necessary openings are cut. Do not patch openings with mortar or other material.

C. Tolerances:
1. Masonry shall be laid true to vertical and horizontal planes within 1/8 inch in 10 feet (3 mm in 3 meters), non-cumulative. Recess masonry where indicated.
2. Maintain 3/8 inch (9.5 mm) mortar joints throughout.

D. Masonry Veneer Ties:
1. Free of material that may destroy bond.
2. Install as detailed by screwing through sheathing into framing. Begin approximately 8 inches (200 mm) from base of masonry and with maximum spacing of 16 inches (400 mm) vertically and at each vertical stud horizontally. Install final row of ties within 8 inches (200 mm) of top course of brick.

E. Flashing: Install embedded flashing behind lower edge of air infiltration barrier.

F. Laying:
1. Layout:
   a. Running bond except where noted otherwise. Select brick so there is uniform distribution of hues.
   b. Use solid brick where brick coursing would otherwise show cores.
2. Joints:
   a. Do not tool until mortar has taken initial set.
   b. Tool concave. When tooling joints, squeeze mortar back into joint.
   c. Point holes in joints. Fill and tool properly.
3. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set.
4. Wet each brick to saturation. Lay brick when surface is dry. Brick absorption when laid should not exceed 0.025 oz/sq inch (457 g/sq mm) maximum.
5. Set masonry units within one minute of spreading mortar. Shove brick into place in full mortar bed, do not lay.
6. Completely fill horizontal and vertical joints. Do not furrow bed joints.
7. Strike back-side joints on brick flush. Do not allow mortar build-up in cavity between masonry veneer and stud wall sheathing.
8. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

3.4 CLEANING

A. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.

B. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.

C. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

D. Waste Management:

1. Clean up masonry debris and remove from site.

3.5 PROTECTION

A. General:
   1. Protect masonry with cover during rainy weather.

B. Stain prevention: Prevent grout, mortar, and soil from staining face of masonry to be left exposed. Immediately remove mortar and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with pointed and integral finishes, from mortar droppings.
   4. Turn scaffold boards near wall on edge at end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

END OF SECTION

B L A N K P A G E

SECTION 05 0503

SHOP-APPLIED METAL COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of factory or shop-applied priming applied to steel supplied to Project without finish coat.
   2. Quality of and procedures for field touch-up and repair of factory-applied priming and galvanizing.

B. Related Requirements:
   1. Sections under 09 9000 heading: Finish painting.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A780/A780M-09, ‘Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.'
      b. ASTM B695-04(2009), 'Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.'

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Product data and samples, if requested by Architect.

PART 2 - PRODUCTS

2.1 FINISHES

A. Factory And Shop-Applied Primer:
   1. Compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.
   2. Primer on unexposed, unfinished surfaces may be fabricator's standard shop coat.

B. Repairs To Primed Surface:

C. Unless otherwise specified, use primer which matches characteristics of original primer and is compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.

D. Material For Repairs Of Galvanized Surfaces:
   1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
      a. Zinc-Rich Paints:
         1) Zinc-Dust Content: Dried film shall contain 94 percent minimum of zinc-dust by weight.
         2) Type One Acceptable Manufacturers:
            a) Galvax by Alvin Products Inc, Everett, MA www.alvinproducts.com.

b) ZRC Galvilite by ZRC Worldwide, Marshfield, MA www.zrcworldwide.com.
c) Equal as approved by Architect before bidding. See Section 01 6200.

2. Structural, Load-Bearing Items And Items Exposed To Weather:
   a. Zinc-Based Solders, Powder, Or Rod:
      1) Zinc-Cadmium solder with liquidus temperature range from 518 to 527 deg F (270 to 275 deg C), or
      2) Zinc-Tin-Lead alloy with liquidus temperature range from 446 to 500 deg F (230 to 260 deg C).
   b. Sprayed Zinc: Wire, ribbon, or powdered zinc suitable for process.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation:
   1. General:
      a. Clean, grind, or otherwise prepare welds in steel that is to be coated within limits acceptable to welder responsible for structural integrity.
      b. Surfaces to be coated shall be clean, dry and free of oil, grease, and corrosion products.
   2. Preparation Of Primed, Ungalvanized Surfaces:
      a. Clean welds and grind serious abrasions.
   3. Preparation Of Galvanized Surfaces:
      a. Follow requirements of ASTM A780/A780M and following:
      b. For Repair Using Zinc-Rich Paints:
         1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP10 (1 to 2 mil anchor pattern), as minimum.
         2) Where circumstances do not allow blast cleaning, power disk sand to bright metal finish.
         3) Extend surface preparation into undamaged galvanized area.
         4) Remove flux residue and weld spatter from welded areas.
      c. For Repair Using Zinc-Based Alloys:
         1) Clean surface to be reconditioned using wire brush, light grinding action, or mild blasting.
         2) Extend surface preparation into surrounding, undamaged galvanized areas.
         3) Remove flux residue and weld spatter from welded areas.
         4) Preheat cleaned area to at least 600 deg F (316 deg C).
            a) Do not overheat surface beyond 750 deg F (400 deg C) or allow surrounding galvanized coatings to be burned.
            b) Wire brush surface during preheating.
      d. For Repair Using Sprayed Zinc (Metallizing):
         1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP5 as minimum.
         2) Extend surface preparation into undamaged galvanized area.
         3) Remove flux residue and weld spatter from welded areas.

3.2 REPAIR / RESTORATION

A. Repairs To Primed, Ungalvanized Surfaces:
   1. Thoroughly clean metal and give one (1) prime coat of specified material, well-worked into metal joints and open spaces. Match existing primed finish as required.
      a. Do not apply primer at temperatures below 45 deg F (7 deg C).
      b. Protect un-primed machine-finished surfaces against corrosion by priming.

B. Repairs To Galvanized Surfaces:
   1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:

a. Repair Using Zinc-Rich Paints: Spray- or brush-apply zinc-rich paint to prepared area. Apply paint in single application employing multiple spray passes to achieve dry film thickness of 2 mils.

2. Structural, Load-Bearing Items And Items Exposed To Weather:
   a. Repair Using Zinc-Based Alloys:
      1) Rub cleaned, pre-heated areas with repair stick to deposit evenly distributed layer of zinc alloy. If powdered zinc alloys are used, sprinkle powder on surface and spread out with spatula or similar tool.
      2) Remove flux residue by rinsing with water or wiping with damp cloth.
   b. Repair Using Sprayed Zinc (Metallizing): Apply 2 mil minimum coating by means of metal-spraying pistols fed with either zinc wire or zinc powder in accordance with requirements of ASTM B695, Type I.
3. All Items:
   a. Apply repair materials immediately after surface preparation is complete.
   b. Take thickness measurements, with either magnetic or electromagnetic gauge, to ensure applied coating is as specified or agreed to.

END OF SECTION

B L A N K P A G E

SECTION 06 2024

DOOR, AND FINISH HARDWARE INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

A. Products Installed But Not Furnished Under This Section:
   1. Finish hardware.

1.2 REFERENCES

A. Association Publications:
   1. Door and Hardware Institute (DHI) 14150 Newbrook Drive, Suite 200 Chantilly, VA www.dhi.org, *Installation Guide for Doors & Hardware' by Door & Hardware Institute*.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Installer Report:
      a. Report verifying correct operation and adjustment of installed hardware.
   2. Special Procedure Submittals:
      a. Copy of 'Installation Guide for Doors & Hardware' by Door & Hardware Institute. Guide may be obtained from Door and Hardware Institute (DHI).

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware:
   1. General:
      a. Install using set of Manufacturer's installation, adjustment, and maintenance instructions submitted with hardware under Section 08 7101. Follow as closely as possible.
      b. Mount closers on jamb stop side of door in parallel arm configuration where it is physically possible to do so and not damage or hinder operation of door or closer.
   2. Hardware for Wood Doors:
      a. If doors are not factory-machined, use hardware templates furnished by Hardware Manufacturer when mounting hardware.
      b. Set hinges flush with edge surface. Be sure that hinges are set in a straight line to prevent distortion.
      c. Mount door latches high in strike plate opening so when door later settles, latch will not bind.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

END OF SECTION

SECTION 07 9213

ELASTOMERIC JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

1.2 REFERENCES

A. Definitions:
   1. Adhesive: An adhesive, as defined by The American Society for Testing and Materials (ASTM), is “a substance capable of holding materials together by surface attachment“
   2. Caulk: Caulks have a variety of definitions but are generally recognized as materials used in applications where only minor elastomeric properties are needed.
   3. Sealant. Sealants are generally used in applications where elastic properties are needed while adhesives are generally used in applications where bonding strength and rigidity are needed. With technology advancements both sealants and adhesives can be used interchangeably depending on the applications performance requirements.

B. Association Publications:
   1. American Architectural Manufacturers Association (AAMA):
      a. “Voluntary Specifications and Test Methods for Sealants”.
   2. ASM International:
      a. “Adhesives and Sealants”, Volume 3, ASM International Handbook Committee, May 1999.
      b. Committee C24 on Building Seals and Sealants for various Specifications, Guides, Test Methods, and Practices related to sealant specifying and application.
      c. Committee E6 on Building Performance for various Specifications, Guides, Test Methods, and Practices related to sealant use with air barriers, vapor retarders, and exterior enclosure systems and materials.
   3. The Adhesive and Sealing Council, Inc. (ASC) / Sealant, Waterproofing & Restoration Institute (SWR Institute):
      a. “Sealants: The Professional’s Guide”.
      b. “Joint Sealants”, Whole Building Design Guide”.

C. Reference Standards:
   1. ASTM International:
      a. ASTM C920-08, ‘Standard Specification for Elastomeric Joint Sealants.'
      b. ASTM C1193-09, ‘Standard Guide for Use of Joint Sealants.’

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:

1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
      b. Manufacturer's literature for each Product.
      c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:
   1. Certificates:
      a. Manufacturer's Certificate:
         1) Certify products are suitable for intended use and products meet or exceed specified requirements.
         2) Certificate from Manufacturer indicating date of manufacture.
   2. Manufacturers' Instructions:
      a. Manufacturer's installation recommendations for each Product.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver and keep in original containers until ready for use.

B. Storage and Handling Requirements:
   1. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
   2. Store in a cool dry location, but never under 40 deg F (4 deg C).

1.6 FIELD CONDITIONS

A. Ambient Conditions:
   1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
   2. Follow Manufacturer's temperature recommendations for installing sealants.

1.7 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty covering sealant materials.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Dow Corning Corp, Midland, MI www.dowcorning.com.
      b. GE Sealants & Adhesives, Huntersville, NC www.gesealants.com

c. Laticrete International Inc, Bethany, CT www.laticrete.com.
d. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
e. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
f. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
1. General:
a. Sealants provided shall meet Manufacturer's shelf-life requirements.
b. Sealants must adhere to and be compatible with specified substrates.
c. Primers, if required, shall not stain and shall be compatible with substrates.
d. Sealants shall be stable when exposed to UV, joint movements, and particular environment prevailing at project location.
e. Sealant shall be a formulation meeting the performance requirements of ASTM C 920.
2. General Interior Sealants:
a. Inside jambs and heads of exterior door frames.
b. Both sides of interior door frames.
c. Miscellaneous gaps between substrates.
d. Paintable sealant:
1) Approved Product.
a) GE Silicone II XST.
e. Non-Paintable sealant:
1) Approved Product.
a) Tub, Tile, And Ceramic Silicone Sealant by Dow Corning.
b) GE Silicone II - Window and Door with BioSeal.
c) Latasil Silicone Sealant by Laticrete.
d) Pro-Select Kitchen And Bath Silicone Sealant by Sherwin Williams.
e) Tremsil 200 Silicone Sealant by Tremco.
3. Sealants For Interior Joints Formed By:
a. Countertops and backsplash to wall.
b. Sinks and lavatories to countertops.
c. Joints between plumbing fixtures and other substrates.
d. Approved Products.
1) Tub, Tile, And Ceramic Silicone Sealant by Dow Corning.
2) GE Silicone II - Kitchen & Bath with BioSeal by GE Sealants & Adhesives.
3) Latasil Silicone Sealant by Laticrete.
4) Pro-Select Kitchen And Bath Silicone Sealant by Sherwin Williams.
5) Tremsil 200 Silicone Sealant by Tremco.
4. Color: As selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

A. Backing:
1. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.

PART 3 - EXECUTION

3.1 PREPARATION

A. Apply primer, if required.

B. Joint Backing:

1. Prepare joints in accordance with ASTM C1193.
2. Clean concrete joint surfaces to remove dirt, dust, oils, paints, curing agents and form release agents.
3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.
4. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

3.2 APPLICATION

A. Do not use damaged or deteriorated materials.

B. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.

C. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.

D. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

E. Do not apply caulking at temperatures below 40 deg F (4 deg C).

F. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.3 CLEANING

A. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

END OF SECTION

SECTION 08 1213

HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Hollow metal frames.

B. Related Requirements:
   1. Section 06 2024: Installation.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / Steel Door Institute:
      a. ANSI/SDI A250.8-2003, 'Standard Steel Doors and Frames.'
      b. ANSI/SDI A250.11-2002, 'Recommended Erection Instructions for Steel Frames.'
   2. ASTM International:
      a. ASTM A568/A 568M-09a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
      b. ASTM A653/A653M-09a, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature for each type of product indicated. Include construction details, material descriptions, fire-resistance rating and finishes.
   2. Shop Drawings: Include the following.
      a. Elevations of each frame design.
      b. Details for each frame type, including dimensioned profiles and metal thickness.
      c. Locations of reinforcement and preparations for hardware.
      d. Details of each different wall opening condition.
      e. Details of anchorages, joints, field splices and connections.
      f. Details of accessories.
      g. Details of moldings, removable stops and glazing.
      h. Details of conduit and preparations for power, signal and control systems.
   3. Schedule:
      a. Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and opening as those on Drawings. Coordinate with door hardware schedule.

B. Informational Submittals:
   1. Copy of ANSI/SDI A250.11.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
1. Approved Suppliers:
   a. Architectural Building Supply, Salt Lake City, UT
   b. Beacon Metals Inc, Salt Lake City, UT
   c. RIMCO, Salt Lake City, UT

B. Manufacturers:
1. Approved Manufacturers:
   a. Any current member of Steel Door Institute.

C. Frames:
1. Cold rolled furniture steel.
   a. Interior Frames: 16 ga. (1.6 mm).
   b. Exterior Frames: 14 ga. (1.9 mm).
2. Provide labeled frame to match fire rating of door.

3. Finish:
   a. Use one of following systems:
      1) Prime surfaces with rust inhibiting primer.
      2) Galvanize.
4. Anchors: 16 US ga (1.6 mm) minimum meeting UL or other code acceptable requirements for door rating involved.

D. Fabrication:
1. General Requirements:
   a. Frames shall be welded units. Provide temporary spreader on each welded frame.
   b. Provide Manufacturer's gauge label for each item.
   c. Make breaks, arrises, and angles uniform, straight, and true. Accurately fit corners.
2. Frame width dimension:
   a. Fabricate frame 1/8 inch (3 mm) wider than finished wall thickness as described in Contract Documents.
3. Provide mortar guards at strikes and hinges.
4. Anchors:
   a. Provide three jamb anchors minimum for each jamb. On hinge side, install one anchor at each hinge location. On strike side, install one anchor at strike level and anchors at same level as top and bottom hinges. Tack weld anchors on frames intended for installation in framed walls.
   b. Frames installed before walls are constructed shall be provided with extended base anchors in addition to other specified anchors.
   c. Anchor types and configurations shall meet wall conditions.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 1313

HOLLOW METAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Hollow metal doors.

B. Related Requirements:
   1. Section 06 2024: Door installation.

1.2 REFERENCES

A. Definitions:

B. Reference Standards:
   1. American National Standards Institute / Steel Door Institute:
      a. ANSI/SDI A250.8-2003 (R2008), 'Standard Steel Doors and Frames.'
   2. ASTM International:
      a. ASTM A568 / A 568M-07a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
      b. ASTM A653 / A653M-08, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'
      c. ASTM C1036-06, 'Standard Specification for Flat Glass.'
      d. ASTM C1048-04, 'Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass.'
   3. National Association of Architectural Metal Manufacturers (NAAMM):
      a. HMMA 810-09, 'Hollow Metal Manual'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature for each type of product indicated. Include construction details, material descriptions, fire-resistance rating and finishes.
   2. Shop Drawings: Include the following.
      a. Elevations of each door design.
      b. Details for each door type, including dimensioned profiles and metal thickness.
      c. Locations of reinforcement and preparations for hardware.
      d. Details of anchorages, joints, field splices and connections.
      e. Details of accessories.
      f. Details of moldings, removable stops and glazing.
      g. Details of conduit and preparations for power, signal and control systems.
   3. Schedule:
      a. Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and opening as those on Drawings. Coordinate with door hardware schedule.

B. Informational Submittals:
   1. Copy of ANSI/SDI A250.8.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
   1. Approved Suppliers.
      a. Architectural Building Supply, Salt Lake City, UT
      b. Beacon Metals Inc, Salt Lake City, UT
      c. RIMCO, Salt Lake City, UT

B. Manufacturers:
   1. Approved Manufacturers.
      a. Any current member of Steel Door Institute.

C. Doors:
   1. Meet one of following requirements:
      a. Meet requirements of Steel Door Institute ANSI / SDI A250.8.
      b. Commercial grade steel meeting requirements of ASTM A568, Class 1.
         1) Grade I for interior doors, Grade II for exterior doors.
         2) Model 1 Full Flush or Model 2 Seamless designs at Manufacturer's option.
         3) Finish:
            a) Interior doors primed or galvanized as per ASTM A653.
            b) Exterior doors galvanized and primed as per ASTM A653.
   2. Insulation: Insulate doors at exterior of main building sufficient to provide U-value of 0.37 minimum and 0.10 maximum.

D. Fabrication:
   1. General:
      a. Mortise and reinforce doors for hinges and locks.
      b. Reinforce doors for closers and other surface applied hardware.
      c. Drill and tap on job.
      d. Seams along vertical edges of door need not be filled.
      e. Do not extend hinge cut out full width of door unless fill strip is inserted, weld filled, and ground smooth so no seam appears on back face plate.

2.2 SOURCE QUALITY CONTROL

A. Tests:
   1. Verification of Performance:
      a. Label each door as conforming to above required standards.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 1429

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Factory-finished flush wood doors.

B. Related Requirements:
   1. Section 06 2024: Installation.

1.2 REFERENCES

A. Abbreviations And Acronyms:
   1. AWS: Architectural Woodwork Standards (formerly AWI).
   2. FD: Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.
   3. FD-5: Core with 2 layers on each side.
   4. ME: Matching edges, i.e., vertical edges same as decorative faces.
   5. PC: Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.
   6. PC-5: Core with 2 layers on each side.

B. Association Publications:
   1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
      a. Architectural Woodwork Standards (AWS), 1st Edition, 2009.

C. Definitions:
   1. Adhesive, Type I (fully waterproof): Forms a bond that will retain practically all of its strength when occasionally subjected to a thorough wetting and drying; bond shall be of such quality that specimens will withstand shear and the two-cycle boil test specified in ANSI/HPVA HP (latest edition).
   2. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are “opened” as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
   3. Core: The material (typically, veneer, lumber, particleboard, medium-density fiberboard, or a combination of these) on which an exposed surface material (typically, veneer or HPDL) is applied.
   4. Core, Solid: The innermost layer or section in flush door construction. Typical constructions are as follows:
      a. Core, Mineral: A fire-resistant core material generally used in wood doors requiring fire ratings of 3/4 hours or more.
      b. Particleboard - A solid core of wood or other lignocellulose particles bonded together with a suitable binder, cured under heat, and pressed into a rigid panel in a flat-platen press.
   5. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.

6. Fire-rated: Fire-retardant particleboard with an Underwriters' Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
7. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
8. Flitch: A hewn or sawn log made ready for veneer production or the actual veneer slices of one half log, kept in order, and used for the production of fine plywood panels.
9. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
    a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
    b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
10. Plain Slicing: Most commonly used for hardwood plywood. The log is cut in half, and one half is placed onto a carriage and moved up and down past a fixed knife to produce the veneers. Veneer is sliced parallel to the pith of the log and approximately tangent to the growth rings to achieve flat-cut veneer. Each piece is generally placed in a stack and kept in order. One half log, sliced this way, is called a "flitch."
11. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
12. Stile-and-Rail Construction: A technique often used in the making of doors, wainscoting, and other decorative features for cabinets and furniture. The basic concept is to capture a panel within a frame, and in its most basic form it consists of five members: the panel and the four members that make up the frame. The vertical members of the frame are called stiles, while the horizontal members are known as rails.

D. Reference Standards:
    1. American National Standards Institute / Composite Panel Association:
        a. ANSI A208.1-1999, 'Particleboard.'
    2. American National Standards Institute / Hardwood Plywood & Veneer Association:
        a. ANSI / HPVA HP-1-2004 01-Jan-2004 'American National Standard for Hardwood and Decorative Plywood.'
    3. ASTM International:
        a. ASTM C1036-06, 'Standard Specification for Flat Glass.'
        b. ASTM C1048-04, 'Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass.'
    4. Underwriters Laboratories, Inc.
        a. UL 9, 'Standard for Fire Tests of Window Assemblies' (Eighth Edition Jul 2, 2009).
        b. UL 10B, 'Standard for Fire Tests of Door Assemblies' (Ten Edition Feb 7, 2008).

1.3 SUBMITTALS

A. Action Submittals:
    1. Shop Drawings:
        a. Schedule showing type of door at each location. Included shall be size, veneer, core type, fire rating, hardware prep, openings, blocking, etc.
        b. Indicate factory finish color and type.
    2. Samples:
        a. Interior Hardwood for Transparent Finish:
            1) Before performing work of this Section, prepare sample, to match Control Sample available from project, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324. Control Sample will be wood item from existing project such as existing door.
            2) Design Criteria:

a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match stain Control Sample provided for Project.
b) Control Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals
1. Source Quality Control Submittals:
a. Samples:
1) Interior Hardwood for Transparent Finish:
a) Owner will provide Control Sample from project for finish.

C. Closeout Submittals:
1. Include following information in Operations And Maintenance Manuals specified in Section 01 7800:
a. Record Documentation:
1) Manufacturers Documentation:
a) Manufacturer's product literature on doors and factory finish.
b) Maintenance and repair instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver in clean truck and, in wet weather, under cover.
2. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.
3. Individually wrap in polyethylene bags for shipment and storage.

B. Storage And Handling Requirements:
1. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.
2. Store flat on level surface in dry, well ventilated space.
3. Cover to keep clean but allow air circulation.
4. Do not subject doors to direct sunlight, abnormal heat, dryness, or humidity.
5. Handle with clean gloves and do not drag doors across one another or across other surfaces.
6. Leave shipping bag on door after installation until immediately before substantial completion inspection.
7. Doors have been acclimated to the field conditions for a minimum of 72 hours before installation is commenced.

1.5 WARRANTY

A. Manufacturer Warranty:
1. Manufacturer's standard full door warranty for lifetime of original installation.
a. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
b. Warranty to include defects in materials including following:
1) Delaminating in any degree.
2) Warp or twist of 1/4 inch (6 mm) or more in door panel at time of one-year warranty inspection.
3) Telegraphing of core assembly: Variation of 1/100 inch (0.25 mm) or more in 3 inch (75 mm) span.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
1. Approved Suppliers:
   a. Architectural Building Supply, Salt Lake City, UT
   b. Beacon Metals Inc, Salt Lake City, UT
   c. RIMCO, Salt Lake City, UT

B. Manufacturers:
1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
   a. Algoma Hardwoods, inc.
   b. Buell Door Co, Dallas, TX
   c. Eggers Industries, Architectural Door Division.
   d. Fenestra Wood Door Division, Oshkosh, WI
   e. Graham Wood Doors, Mason City, IA.
   f. Marshfield Door Systems Inc, Marshfield, WI.
   g. VT Industries, Holstein, IA.

C. Wood Doors:
1. Type: AWS PC-5ME or FD-5ME.
2. Grade: AWS Premium, except face veneer.
3. Fully Type I Construction: Adhere all glue lines with Type I adhesive, including veneer lay-up.
4. Face Veneer:
   a. Wood species, cut and veneer match to match existing doors meeting requirements of AWS Grade A, 1/50 inch (0.5 mm) thick minimum immediately before finishing.
5. Core:
   a. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
   b. Non-Rated And Fire-rated, AWS FD 1/3:
      1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
      2) Stiles:
         a) 1-3/8 inches (35 mm) deep minimum before fitting.
         b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
      3) Rails:
         a) 1-1/8 inches (28 mm).
         b) Manufacturer's option.
6. Field Glazing:
   a. Glazing: See Section 08 8100.
   b. Lite Kit:
      1) Design Criteria: match existing
      2) Dimensions:
         a) 24 inch (610 mm) wide by 36 inches (914 mm) high cutout opening.

D. Fabrication:
1. Doors shall be factory-machined. Coordinate with Section 08 1213 and Sections under 08 7000.

E. Finishes:
1. Factory Finishing:
   a. Applied by Door Manufacturer before leaving factory.
   b. Performance / Design Criteria:
      1) Finish: factory-finish to match Owner provided sample.
         a) Control Sample will be existing wood item from Project.

c. Finish: AWS Finish System TR-6 Catalyzed Polyurethane Premium Grade for unfilled, open-grain woods.

2.2 SOURCE QUALITY CONTROL

A. Inspections:
1. Verification of Performance:
a. Doors shall have following information permanently affixed on top of door:
1) Manufacturer:
2) Door designation or model.
3) Veneer species.
4) Factory finish.
2. Clear Finished Hardwood:
a. Color matches Owner provided sample.

PART 3 - EXECUTION: Not Used

END OF SECTION

B L A N K PA G E

SECTION 08 4113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install aluminum storefront entry and window systems, including hardware, glazing, and caulking, as described in Contract Documents and including the following:

B. Related Requirements:
   1. Section 07 9213: Quality of sealants.
   2. Section 08 4229: Sliding Automatic Entrances
   3. Section 08 8100: Quality of glass glazing.
   4. Section 28 1300: Access Control:
   5. Section 26 0533: Raceways and Boxes for Electrical Systems.

1.2 REFERENCES

A. Association Publications:
   1. American Architectural Manufacturers Association (AAMA):
      a. AAMA 506-06, 'Voluntary Specifications for Hurricane Impact and Cycle Testing of Fenestration Products.
      b. AAMA 607.1-77, 'Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum'.
      c. AAMA 611-98, 'Voluntary Standards for Anodized Architectural Aluminum'.
      d. AAMA 701/702-04, 'Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals'.
   2. Glass Association of North America (GANA):
      a. *'Glazing Manual'*.
   3. National Association of Architectural Metal Manufacturers (NAAMM):
      a. Metal Finishes Manual for Architectural and Metal Products.

B. Definitions:
   1. Activation Device: Device that, when actuated, sends electrical signal to door operator to open door.
   2. Glass Surface:
      a. Insulated glass unit:
         1) Surface 1: Exterior surface of outer lite.
         2) Surface 2: Interspace-facing surface of outer lite.
         3) Surface 3: Interspace-facing surface of inner lite.
         4) Surface 4: Interior surface of inner lite.
      b. Monolithic glass:
         1) Surface 1: Exterior surface.
         2) Surface 2: Interior surface.
   3. Safety Device:
      a. Device that prevents door from opening or closing, as appropriate.

C. Reference Standards:
   1. American National Standards Institute / Builders Hardware Manufacturers Association:

a. ANSI/BHMA A156.5-2010, ‘Auxiliary Locks and Associated Products'.
b. ANSI/BHMA A156.18-2006, ‘Materials and Finishes’.
c. ANSI/BHMA A156.19-2007, ‘Power Assist and Low Energy Power Operated Doors'.
d. ANSI/BHMA A156.21-2009, ‘‘American National Standard for Thresholds’.

2. ASTM International:
   a. ASTM B209-10, ‘Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate’.
   b. ASTM B221-08, ‘Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes'.
   c. ASTM E1996-09, ‘Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes’.
   d. ASTM E2112-07, 'Standard Practice for Installation of Exterior Windows, Doors and Skylights'.
3. International Building Code (IBC):
   a. Chapter 10, 'Means of Egress'.
4. International Code Council / American National Standards Institute:
   a. ICC / ANSI A117.1-2010, ‘Accessible and Usable Buildings and Facilities'.
5. National Fenestration Rating Council (NFNC):
   a. NFRC 100-2004, 'Procedure for Determining Fenestration Product U-factors’.
6. National Fire Protection Association / American National Standards Institute:
   a. NFPA 101–2012, ‘Life Safety Code'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference.
      a. Schedule pre-installation conference one (1) week before scheduled installation of storefront system.
      b. In addition to requirements of Section 01 3100, review following:
         1) Review rough opening requirements:
            a) New additions:
               (1) Make certain rough openings are within tolerances required for installation of factory-fabricated frames.

            b) Existing Building:
               (1) Field verify rough openings before fabrication of storefront entrances.
         2) Review installation scheduling, coordination, placement of doors.
         3) Review low-energy door operator location and requirements.
         4) Review delivery, storage, and handling requirements.
         5) Review 'Examination' requirements before sliding door installation.
         6) Review 'Finish' door and hardware requirements.
         7) Review 'Protection' responsibilities.
         8) Review 'Cleaning' responsibilities.
         9) Review safety issues.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature.
         1) Storefront entry system.
         2) Hardware.
      b. Color and finish.
   2. Shop Drawings:
      a. Show locations, sizes, etc, of hardware reinforcing.
      b. Show wind loads and engineering for Project conditions.

B. Informational Submittals:
   1. Qualification Statement:
      a. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance, adjustment, and repair instructions.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.
            a) Storefront warranty.
            b) Storefront closers.
      c. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature or cut sheets for storefront system and for each item of hardware.
            b) Manufacturer’s literature of cut sheets for low-energy door operators.
            c) Color and finish selections.
            d) Parts lists.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Provide wind load and impact testing by testing laboratory when required by local codes and jurisdictions.
      a. See Section 01 4523 for Testing and Inspection administrative requirements and responsibilities for Testing Agencies and Section 01 4301 for Testing Agency Qualifications.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
   1. Manufacturer Qualifications:
      a. Provide aluminum entrances and storefront systems produced by a firm experienced in manufacturing systems that are similar to those indicated for this project and that have a record of successful in service performance.
   2. Fabricator Qualifications:
      a. Provide aluminum entrances and storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and that have a record of successful in service performance.
      b. Fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.
   3. Installer Qualifications:
      a. Minimum three (3) years experience in storefront installations.
      b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
      c. Upon request, submit documentation.

C. Air infiltration rate: 1.00 CFM/FT2 (NFRC 400 or ASTM E283 at 1.57 psf (75 Pa)

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver all parts of door, together with hardware, in original, unopened packages with labels intact to Project at same time.

B. Storage And Handling Requirements:

1. Store in clean, dry location, indoors in Manufacturer's unopened packaging until ready for installation and in accordance with Manufacturer's instructions.
2. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.
3. Protect materials and finish from damage during handling and installation.

1.7 WARRANTY

A. Manufacturer Warranty:
   1. Storefront Entrances:
      a. Manufacturer's Warranty to be free of defects in material and workmanship.
      b. Manufacturer's Warranty against deterioration or fading.
      c. Manufacturer's Lifetime Warranty for Door Construction for normal use.
   2. Closers:
      a. Closer Manufacturer's standard warranty, 10 years minimum.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Design and Quality Standard Manufacturers.
      a. Kawneer North America, Norcross, GA, www.kawneer.com/kawneer/north_america.
      b. Oldcastle BuildingEnvelope, Santa Monica, CA www.oldcastlebe.com.

B. Materials:
   1. Frames:
      a. Aluminum:
         1) 6063-T5 aluminum alloy or meet requirements of ASTM B221, alloy GS 10A-T6 or T6..
      b. Mullion:
         1) Steel reinforced or heavy duty as necessary to prevent lateral flexing of mullion.
      c. Sills:
         1) Match height of door bottoms.
      d. Sealer Tape:
         1) 3M.
      e. Fasteners:
         1) Aluminum or non-magnetic stainless steel.
         2) Concealed fastenings shall be cadmium or zinc-plated steel.
      f. Finish:
         1) Match existing aluminum framing.
      g. Design and Quality Standard Products.
         1) Single Glazed:
            a) Trifab '450' by Kawneer.
            b) Series FG2000 1-3/4x4-1/2 by Oldcastle.
         2) Double Glazed:
            a) Trifab '451' by Kawneer.
            b) Series FG3000 2x4-1/2 by Oldcastle.

C. Fabrication:
   1. Construction shall meet Manufacturer's recommendations.
   2. Fabricate in factory to dimensions required to fit framed openings detailed on Contract Documents. Joints shall be tightly closed.
   3. Mortise in manner to give maximum hardware-door connection strength and neatness of appearance. Adequately reinforce with backplates or rivnuts to hold pivots and closers.

D. Hardware Finishes:
   1. Finishes for steel, brass, or bronze hardware items shall be US26D, Chromium plated, satin.
   2. Materials other than steel, brass, or bronze shall be finished to match the appearance of US26D.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Verify that framed openings comply with Contract Document requirements.
   2. Verify floor is level across entire width of door opening.
   3. Verify sill conditions are level and/or sloped away from openings as specified.
   4. Notify Architect and Owner in writing if framed openings are not as agreed upon.
      a. Do not install storefront entry and window frames until deficiencies in framed openings have been corrected to allow installation of standard entries and windows.
      b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. General:
   1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
   2. All installation shall be in accordance with manufacturer's published recommendations.
   3. Do not install damaged components. Fit frame joints tight, free of burrs and distortion. Rigidly secure non-movement joints.
   4. Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, by applying sealer tape to prevent electrolytic action.

B. Set plumb, square, level, and in correct alignment and securely anchor to following tolerances:
   1. Variation from plane: Limit to 1/8 inch (3 mm) in 12 feet (3.6 meters); 1/4 inch (6 mm) over total length.
   2. Offset from Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.6 mm).
   3. Offset at Corners: For surfaces meeting at corner, limit offset to 1/32 inch (0.8 mm).
   4. Diagonal measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).
   5. Sidelites: Line up horizontal rail in sidelight with door rail.

C. Install doors without warp of rack. Adjust doors and hardware to provide 90 degree operation, tight fit at contact points and smooth operation.

D. Install exterior window units with through wall sill flashing.

E. Thresholds:
   1. Accurately cut thresholds to fit profile of storefront frame. Bed exterior thresholds in specified sealant at contact points with floor and make watertight.

F. Sealants:
   1. Apply in accordance with Section 07 9213 'Elastomeric Joint Sealant'.
   2. Caulk joints between frames and walls, both interior and exterior to provide weather tight installation.

G. Glazing Characteristics:
   1. Interior Vestibule Glazing: Clear.
   2. Exterior Storefront Doors And Sidelights Opening Into Corridors:
      a. Clear interior pane and Clear exterior pane with Low E treatment on surface 2.

b. U value: 0.77 minimum.
c. SHGC: 0,40 minimum.

3.3 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Pull test doors, especially pairs of single doors separated by permanent mullions, to ensure security of opening.

B. Non-Conforming Work:: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
1. Correct any work found defective or not complying with contract document requirements including removal and replacement of glass that has been broken, chipped, cracked, abraded, or damaged during construction period at no additional cost to the Owner.

3.4 ADJUSTING

A. Adjust doors for proper operation after glazing entry. After repeated operation of completed installation, re-adjust door for optimum operating condition and safety if required.

3.5 PROTECTION

A. During Installation:
1. Installer's Responsibility:
a. During installation, all adjacent work shall be protected from damage.

B. After Installation:
1. General Contractor's Responsibility:
a. Institute protective measures required throughout remainder of construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

3.6 CLEANING

A. General:
1. Installer's Responsibility:
a. Follow Manufacturer's written recommendations for cleaning and maintenance or guidelines of AAMA Publications #609 and #610-2 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents).
b. Clean glass and aluminum surfaces, inside and out, promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Exercise care to avoid damage to coatings.
c. Remove nonpermanent labels, protective films, and clean surfaces following recommended procedures.
1) Do NOT remove permanent ANSI/AAMA/CSA or NFRC labels.

B. Waste Management:
1. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

SECTION 08 4229

SLIDING AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of automatic entrances:
1. Exterior and interior, bi-parting, sliding automatic entrances.
2. Sliding automatic entrances shall include delayed egress locking system.

B. Related Sections:
1. Division 7 Sections for caulking to the extent not specified in this section.
2. Division 8 Section "Aluminum-Framed Entrances and Storefronts" for entrances furnished and installed separately in Division 8 Section.
3. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section.
4. Division 8 Section Glazing for materials and installation requirements of glazing for automatic entrances.
5. Division 26 Sections for electrical connections provided separately in Division 26 including conduit and wiring for power to, and control of, sliding automatic entrances.
6. Division 28 Section “Electronic Safety and Security” for systems not specified in this section.

1.3 REFERENCES

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. Underwriters Laboratories (UL):
1. UL 325 – Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.
2. UL 294 – Standard for Access Control System Units

C. American National Standards Institute (ANSI) / Builders’ Hardware Manufacturers Association (BHMA):
1. ANSI/BHMA A156.10: Standard for Power Operated Pedestrian Doors.
2. ANSI/BHMA A156.5: Standard for Auxiliary Locks and Associated Products

D. American Society for Testing and Materials (ASTM):
1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

E. American Association of Automatic Door Manufacturers (AAADM):

F. National Fire Protection Association (NFPA):
1. NFPA 101 – Life Safety Code.
2. NFPA 70 – National Electric Code.

G. International Code Council (ICC):
1. IBC: International Building Code

H. International Organization for Standardization (ISO):
1. ISO 9001 - Quality Management Systems

I. National Association of Architectural Metal Manufacturers (NAAMM):
1. Metal Finishes Manual for Architectural and Metal Products.

J. American Architectural Manufacturers Association (AAMA):
1. AAMA 606.1 – Integral Color Anodic Finishes for Architectural Aluminum.
2. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
3. AAMA 701 Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals.

1.4 DEFINITIONS

A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to open the door.

B. Safety Device: Device that prevents a door from opening or closing, as appropriate.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide automatic entrance door assemblies capable of withstanding loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Thermal Movements: Provide automatic entrances that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. Operating Range: Minus 30 deg F (Minus 34 deg C) to 130 deg F (54 deg C).

D. Opening-Force Requirements for Egress Doors: Not more than 50 lbf (222 N) required to manually set door in motion if power fails, and not more than 15 lbf (67 N) required to open door to minimum required width.

E. Closing-Force Requirements: Not more than 30 lbf (133 N) required to prevent door from closing.

F. Sliding automatic entrances specified with delayed egress locking shall be designed to function as follows when secured:
1. Entrances shall be normally closed and locked by delayed egress locking system with motion activation system disabled.
2. Upon signal from secure activation device, sliding automatic entrances will unlock and open enabling motion activation system. Entrance will be held open as long as an object or pedestrian remains in the activation or safety zones.
3. Once all activation and safety zones have cleared the entrance will close and re-lock, returning to normal state.
4. Engaging the panic release bar for longer than the nuisance delay time initiates an irreversible alarm sequence, sounding an audible alarm and delaying egress for a selectable time period.

5. After expiration of the delayed egress time period, delayed egress locking system is disengaged, allowing emergency egress with audible alarm continuing to sound until reset.

1.6 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

B. Shop Drawings: Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.

C. Color Samples for selection of factory-applied color finishes.

D. Closeout Submittals:
1. Owner’s Manual.
2. Warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative, with certificate issued by AAADM, who is trained for installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer with a manufacturing facility certified under ISO 9001.

C. Manufacturer shall have in place a national service dispatch center providing 24 hours a day, 7 days a week, emergency call back service.

D. Certifications: Automatic sliding door systems shall be certified by the manufacturer to meet performance design criteria in accordance with the following standards:
1. ANSI/BHMA A156.10.
2. NFPA 101.
3. UL 325 listed.
4. IBC 2012

E. Source Limitations: Obtain automatic entrance door assemblies through one source from a single manufacturer.

F. Product Options: Drawings indicate sizes, profiles, and dimensional requirements of automatic entrance door assemblies and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

H. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrances serving as a required means of egress.

1.8 PROJECT CONDITIONS

A. Field Measurements: General Contractor shall verify openings to receive automatic entrance door assemblies by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Mounting Surfaces: General Contractor shall verify all surfaces to be plumb, straight and secure; substrates to be of proper dimension and material.

C. Other trades: General Contractor shall advise of any inadequate conditions or equipment.

1.9 COORDINATION

A. Templates: Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic entrances to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of automatic entrance door assemblies with connections to power supplies, and security access control system. See Division 28 Section “Electronic Safety and Security” for systems not provided under this section.

C. System Integration: Integrate sliding automatic entrances with other systems as required for a complete working installation.
1. Provide electrical interface control capability for activation of sliding automatic entrances by security access system on doors with electric locking.
2. Provide electrical interface to disengage delayed egress locking system on activation of fire alarm system.

1.10 WARRANTY

A. Automatic Entrances shall be free of defects in material and workmanship for a period of one (1) year from the date of substantial completion.

B. During the warranty period the Owner shall engage a factory-trained technician to perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.

C. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal working hours.

PART 2 - PRODUCTS

2.1 AUTOMATIC ENTRANCES

A. Manufacturer: Stanley Access Technologies; Dura-Glide™ 2000 Series sliding automatic entrances.
1. Contact: Stanley Access Technologies, 14918 S. Concorde Park Drive, Bluffdale UT 84065; Attn: George Sunderland; Phone: 801-838-9521; Fax: 801-566-8917; Email: george.sunderland@sbdinc.com.

B. Substitutions: Section 01 6200 ‘Product Options’.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Headers, stiles, rails, and frames: 6063-T6.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Sheet and Plate: ASTM B 209.

B. Sealants and Joint Fillers: Performed under Division 7 Section "Joint Sealants".

2.3 AUTOMATIC ENTRANCE DOOR ASSEMBLIES

A. General: Provide manufacturer's standard automatic entrance door assemblies including doors, sidelights, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.

B. Sliding Automatic Entrances:
1. Configuration: One sliding leaf and one full sidelight.
2. Traffic Pattern: Two-way.
3. Emergency Breakaway Capability: Sliding leaves and sidelights.
4. Mounting: Surface applied.

2.4 COMPONENTS

A. Framing Members: Manufacturer's standard extruded aluminum reinforced as required to support imposed loads.
1. Nominal Size: 1 3/4 inch by 4 1/2 inch (45 by 115 mm).
2. Concealed Fastening: Framing shall incorporate a concealed fastening pocket, and continuous flush insert cover, extending full length of each framing member.

B. Stile and Rail Doors and Sidelights: Manufacturer's standard 1 ¾ inch (45 mm) thick glazed doors with extruded-aluminum tubular stile and rail members. Incorporate concealed tie-rods that span full length of top and bottom rails or mechanically fasten corners with reinforcing brackets that are welded.
1. Glazing Stops and Gaskets: Snap-on, extruded-security aluminum stops and preformed gaskets.
2. Stile Design: Medium stile; 3 ½ inch (89 mm) nominal width.
3. Bottom Rail Design: 4 inch (102 mm) standard nominal height.
4. Muntin Bars: Horizontal tubular rail member for each door; 4 1/4 inch (108 mm) nominal width.

C. Glazing: Furnished under Section 08 8100 Glass Glazing

D. Headers: Fabricated from extruded aluminum and extending full width of automatic entrance door units to conceal door operators, carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
1. Mounting: Concealed, with one side of header flush with framing.
2. Capacity: Capable of supporting up to 220 lb (100 kg) per panel, up to four panels, over spans up to 14 feet (4.3 m) without intermediate supports.

E. Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 1/8 inch (3 mm); consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track. Support panels from carrier assembly by load wheels and anti-riser wheels with factory adjusted cantilever and pivot assembly. Minimum two ball-bearing load wheels and two anti-rise rollers for each active leaf. Minimum load wheel diameter shall be 2 1/2 inch (64 mm); minimum anti-rise roller diameter shall be 2 inch (51 mm).

F. Thresholds: Aluminum, One Side Tapered, 4 1/2 inch (114 mm) frame.

G. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.

H. Signage: Provide signage in accordance with ANSI/BHMA A156.10.

2.5 DOOR OPERATORS

A. General: Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, operation under normal traffic load for type of occupancy indicated.

B. Electromechanical Operators: Self-contained overhead unit powered by a minimum of 1/4 horsepower, permanent-magnet DC motor with gear reduction drive, microprocessor controller; and encoder.
1. Operation: Power opening and power closing.
2. Features:

a. Adjustable opening and closing speeds.
b. Adjustable back-check and latching.
c. Adjustable braking.
d. Adjustable hold-open time between 0 and 30 seconds.
e. Obstruction recycle.
f. On/Off switch to control electric power to operator.
g. Energy conservation switch that reduces door-opening width.
h. Closed loop speed control with active braking and acceleration.
i. Variable obstruction recycle time delay.
j. Self adjusting stop position.
k. Self adjusting closing compression force.
l. Optional Switch to open/Switch to close operation.

3. Mounting: Concealed.
4. Drive System: Synchronous belt type.

C. Electrical service to door operators shall be provided under Division 26 Electrical. Minimum service to be 120 VAC, 5 amps.

2.6 ELECTRICAL CONTROLS

A. Electrical Control System: Electrical control system shall include a microprocessor controller and position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position and speed. Systems utilizing external magnets and magnetic switches are not acceptable.

B. Life Cycle Data Counter: The electrical control system shall incorporate a non-re-settable counter to track door operation cycles.

C. Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation:
1. Automatic Reset Upon Power Up.
2. Main Fuse Protection.
3. Electronic Surge Protection.
4. Internal Power Supply Protection.
5. Resetable sensor supply fuse protection.
6. Motor Protection, over-current protection.

D. Soft Start/Stop: A “soft-start” “soft-stop” motor driving circuit shall be provided for smooth normal opening and recycling.

E. Obstruction Recycle: Provide system to recycle the sliding panels when an obstruction is encountered during the closing cycle. If an obstruction is detected, the system shall search for that object on the next closing cycle by reducing door closing speed prior to the previously encountered obstruction location, and will continue to close in check speed until doors are fully closed, at which time the doors will reset to normal speed. If obstruction is encountered again, the door will come to a full stop. The doors shall remain stopped until obstruction is removed and operate signal is given, resetting the door to normal operation.

F. Programmable Controller: Microprocessor controller shall be programmable and shall be designed for connection to a local configuration tool. Local configuration tool shall be a software driven handheld interface. The following parameters may be adjusted via the configuration tool.
1. Operating speeds and forces as required to meet ANSI/BHMA A156.10.
2. Adjustable and variable features as specified in 2.5, B., 2.
3. Reduced opening position.
4. Fail Safe/Secure control.
5. Firmware update.

6. Trouble Shooting
   a. I/O Status.
   b. Electrical component monitoring including parameter summary.
7. Software for local configuration tool shall be available as a free download from the sliding automatic entrance manufacturer's internet site. Software shall be compatible with the following operating system platforms: Palm®, Android®, and Windows Mobile®.

2.7 ACTIVATION AND SAFETY DEVICES

A. Motion Sensors: Motion sensors shall be mounted on each side of door header to detect pedestrians in the activating zone, and to provide a signal to open doors in accordance with ANSI/BHMA A156.10. Units shall be programmable for bi-directional or uni-directional operation and shall incorporate K-band microwave frequency to detect all motion in both directions.

B. Presence Sensors: Presence sensors shall be provided to sense people or objects in the threshold safety zone in accordance with ANSI/BHMA A156.10. Units shall be self-contained, fully adjustable, and shall function accordingly with motion sensors provided. The sensor shall be enabled simultaneously with the door-opening signal and shall emit an elliptical shaped infrared presence zone, centered on the doorway threshold line. Presence sensors shall be capable of selectively retuning to adjust for objects which may enter the safety zone; tuning out, or disregarding, the presence of small nuisance objects and not tuning out large objects regardless of the time the object is present in the safety zone. The door shall close only after all sensors detect a clear surveillance field.

C. Photoelectric Beams: In addition to the threshold sensor include a minimum of two (2) doorway holding beams. Photoelectric beams shall be pulsed infrared type, including sender receiver assemblies for recessed mounting.

2.8 HARDWARE

A. General: Provide units in sizes and types recommended by automatic entrance door and hardware manufacturers for entrances and uses indicated.

B. Emergency Breakaway Feature: Provide release hardware that allows panel(s) to swing out in direction of egress to full 90 degrees from any position in sliding mode. Maximum force to open panel shall be 50 lbf (222 N) according to ANSI/BHMA A156.10. Interrupt powered operation of panel operator while in breakaway mode.
   1. Emergency breakaway feature shall include at least one adjustable detent device mounted in the top of each breakaway panel to control panel breakaway force.
   2. Limit Arms: Limit arms shall be provided to control swing of sliding non-sliding panels on break-out; swing shall not exceed 90 degrees.

C. Delayed Egress Locking System: Provide delayed egress locking system on sliding automatic entrances as follows:
   1. System shall include:
      a. A fail-secure electric solenoid locking device with a self contained solid state electronic control factory mounted inside the header.
      b. Electro-magnetic shear locks and contact assemblies; concealed mount.
         1) Holding Force: 1200 lb (544 kg) in shear.
         2) Current: 190 mA at 24 VDC.
      c. Recessed flush mounted panic bar, contact assemblies and system control switch. Panic bar shall be concealed within the 4 1/4 inch (108 mm) horizontal muntin bar.
      d. Audible alarm operating at no less than 75 dBA measured 3 feet (914 mm) from the source.
   2. System shall be fully integrated with entrances provided, and shall be listed under UL 294 for operation with the sliding automatic entrances provided herein.

3. The automatic sliding door(s) shall electro-magnetically lock in the closed position. When closed door panels shall be prevented from sliding manually or breaking out for a selectable time period of 15 or 30 seconds.
4. System shall include connection for fire alarm system such that a signal from the fire alarm will disable delayed egress locking system until fire alarm signal is terminated.

D. Control Switch: Provide manufacturer's standard keyed rotary switch mounted on the interior jamb and door position switch to allow for full control of the automatic entrance door. Controls to include, but are not limited to:
1. One-way traffic
2. Reduced Opening
3. Open/Closed/Automatic

E. Power Switch: Sliding automatic entrances shall be equipped with a two position "On/Off" illuminated rocker switch to control power to the door.

F. Sliding Weather Stripping: Manufacturer's standard replaceable components complying with AAMA 701; made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

G. Weather Sweeps: Manufacturer's standard adjustable nylon brush sweep mounted to underside of door bottom.

2.9 FABRICATION

A. General: Factory fabricates automatic entrance door assembly components to designs, sizes, and thickness indicated and to comply with indicated standards.
1. Form aluminum shapes before finishing.
2. Use concealed fasteners to greatest extent possible.
   a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   b. Reinforce members as required to receive fastener threads.

B. Framing: Provide automatic entrances as prefabricated assemblies.
1. Fabricate tubular and channel frame assemblies with manufacturer's standard mechanical or welded joints. Provide sub-frames and reinforcement as required for a complete system to support required loads.
2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
3. Form profiles that are sharp, straight, and free of defects or deformations.
4. Prepare components to receive concealed fasteners and anchor and connection devices.
5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.

C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.

E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated.

F. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site.

2.10 ALUMINUM FINISHES

A. General: Comply with NAAMM Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designing finishes. Finish designations prefixed by AA comply with system established by Aluminum Association for designing finishes.

B. Class I, Color Anodic Finish: AA-M12C22A42/A44 Mechanical Finish: as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.70 mils minimum complying with AAMA 611-98, and the following:
1. Color: Dark Bronze.
2. AAMA 606.1
3. Applicator must be fully compliant with all applicable environmental regulations and permits, including wastewater and heavy metal discharge.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Do not install damaged components. Fit frame joints to produce joints free of burrs and distortion. Rigidly secure non-movement joints.

B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.

C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 16 Sections.

D. Glazing: Performed under Division 8 Section "Glazing" in accordance with sliding automatic entrance manufacturer’s instructions.

E. Sealants: Comply with requirements specified in Division7 Section "Joint Sealants" to provide weather tight installation.

3.3 FIELD QUALITY CONTROL

A. Testing Services: Factory Trained Installer shall test and inspect each automatic entrance door to determine compliance of installed systems with applicable ANSI standards.

3.4 ADJUSTING

A. Adjust door operators, controls, and hardware for smooth and safe operation, for tight closure, and complying with requirements in ANSI/BHMA A156.10.

3.5 CLEANING AND PROTECTION

A. Clean glass and aluminum surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish. Comply with requirements in Division 8 Section “Glazing”, for cleaning and maintaining glass.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware, power supplies, back-ups and surge protection.
3. Cylinders specified for doors in other sections.

C. Related Sections:

1. Section 08 1213 “Hollow Metal Frames”.
2. Section 08 1313 “Hollow Metal Doors Frames”.
3. Section 08 2112 “Flush Wood Doors”.
4. Section 08 4229 “Sliding Automatic Entrances”.
5. Section 28 1300 “Access Control”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 80 - Fire Doors and Windows.
4. NFPA 101 - Life Safety Code.
5. NFPA 105 - Installation of Smoke Door Assemblies.
6. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b. Complete (risers, point-to-point) access control system block wiring diagrams.

2. Electrical Coordination: Coordinate with related Division 26 and 28 Electrical Sections for the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

D. Source Limitations: Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:

1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:

    a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
    b. Door Closers: Comply with the following maximum opening-force requirements indicated:

        1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
        2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

    c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

3. NFPA 101: Comply with the following for means of egress doors:

    a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

    b. Thresholds: Not more than 1/2 inch high.

4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.

    a. Test Pressure: Positive pressure labeling.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors.

Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship

within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Seven years for heavy duty cylindrical (bored) locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closers.
4. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

B. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Section 01 6200

Product Options. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:

1) Out-swinging exterior doors.
2) Out-swinging access controlled doors.
3) Out-swinging lockable doors.

5. Acceptable Manufacturers:

a. Hager Companies (HA).
b. McKinney Products (MK).

2.3 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Standard.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified patented cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) - XC Series.(RD or RC Keyway)
b. Schlage Lock (SC) - Everest C Series.(124 Keyway)

E. Keying System: Each type of lock and cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:

1. Master Key System: Cylinders are operated by a change key and a master key.
2. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
3. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
4. Existing System: Master key or grand master key locks to Owner's existing system.
5. Keyed Alike: Key all cylinders to same change key.

F. Key Quantity: Provide the following minimum number of keys:

1. Top Master Key: One (1)
2. Change Keys per Cylinder: Two (2)
3. Master Keys (per Master Key Group): Two (2)
4. Grand Master Keys (per Grand Master Key Group): Two (2)
5. Construction Keys (where required): Ten (10)
6. Construction Control Keys (where required): Two (2)
7. Permanent Control Keys (where required): Two (2)

G. Construction Keying: Provide construction master keyed cylinders or temporary keyed construction cores where specified. Provide construction master keys in quantity as required by project Contractor. Replace construction cores with permanent cores. Furnish permanent cores for installation as directed under specified "Keying Conference".

H. Key Registration List: Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software.

2.4 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified cylindrical (bored) locksets furnished in the functions as specified in the Hardware Sets. Lock chassis fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt. Locks are to be non-handed and fully field reversible.

1. Acceptable Manufacturers:

a. Schlage (SC) – ND Series.

B. Lock Trim Design: As specified in Hardware Sets.

2.5 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
4. Dustproof Strikes: BHMA A156.16.

2.6 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

a. Fire Exit Removable Mullions: Provide keyed removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions to be used only with exit devices for which they have been tested.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Flush End Caps: Provide heavy weight impact resistant flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty trim with cold forged escutcheons, beveled edges, and four threaded studs for thru-bolts.

   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets. Provided free-wheeling type trim where indicated.
   b. Where function of exit device requires a cylinder, provide an interchangeable core type keyed cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Provide and install interior surface and concealed vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

9. Rail Sizing: Provide exit device rails factory sized for proper door width application.

10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness. Painted or aluminum metal rails are not acceptable. Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature.

1. Acceptable Manufacturers:

   a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
   b. Sargent Manufacturing (SA) - 80 Series.
   c. Von Duprin (VD) - 35A/98 XP Series.

C. Electrified Options: As indicated in hardware sets, provide electrified exit device options including: electric latch retraction , electric dogging, outside door trim control, exit alarm, delayed egress, latchbolt monitoring, lock/unlock status monitoring, touchbar monitoring and request-to-exit signaling. Unless otherwise indicated, provide electrified exit devices standard as fail secure.

2.7 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 10 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

   a. Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
   b. Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
   c. Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
   d. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics. Provide drop plates or other accessories as required for proper mounting.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Acceptable Manufacturers:

   a. Corbin Russwin Hardware (RU) - DC8000 Series.
   b. Sargent Manufacturing (SA) - 351 Series.
   c. Norton Door Controls (NO) - 7500 Series.

C. Door Closers, Overhead Concealed (Heavy Duty): ANSI/BHMA 156.4 certified Grade 1 heavy duty door closers with closers with complete spring power adjustment, sizes 1 thru 6. Closers to have fully concealed body in the frame head and track assembly in the door, rack and pinion type construction, either offset or center hung applications, with separate and independent valves for closing speed, latch speed, and backcheck adjustments. Overhead concealed closers require a minimum 4-inch frame head for mounting.

1. Acceptable Manufacturers:

a. LCN Closers (LC) - 2010 Series.
b. Norton Door Controls (NO) - 7900 Series.
c. Sargent Manufacturing (SA) - 268/278 Series.

2.8 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following.

a. Stainless Steel: 050-inch thick, with countersunk screw holes (CSK).
b. Brass or Bronze: 050-inch thick, with countersunk screw holes (CSK).
c. Laminate Plastic or Acrylic: 1/8-inch thick, with countersunk screw holes (CSK).

4. Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.

5. Metal Door Edging: Door protection edging fabricated from a minimum .050-inch thick metal sheet, formed into an angle or "U" cap shapes, surface or mortised mounted onto edge of door. Provide appropriate leg overlap to account for protection plates as required. Height to be as specified in the Hardware Sets.

6. Acceptable Manufacturers:

a. Rockwood Manufacturing (RO).

2.9 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated,

unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:

    a. Rockwood Manufacturing (RO).

2.10 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Acceptable Manufacturers:

1. Pemko Manufacturing (PE).

2.11 ELECTRONIC ACCESSORIES

A. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Acceptable Manufacturers:

    a. Securitron (SU) - BPS Series.

2.12 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. Manufacturer’s Abbreviations:

1. MK - McKinney
2. RO - Rockwood
3. SU - Securitron
4. SC - Schlage
5. SA - Sargent
6. MC - Medeco
7. HS - HES
8. RF - Rixson
9. PE - Pemko

Hardware Schedule

Set: 1.0
Doors: 101

1	Magnetic Lock	SAM (by door and frame manufacturer)		SU
1	Cylinder	11 63 34/41	US10	SA
1	Motion Sensor	XMS (by door and frame manufacturer)		SU
1	Position Switch	DPS-M-BK (by door and frame manufacturer)		SU
1	Power Supply	BPS-24-2 (by door and frame manufacturer)		SU
1	Threshold	(by door and frame manufacturer)		

Set: 2.0
Doors: 102

1	Motion Sensor	XMS (by door and frame manufacturer)		SU

Set: 3.0
Doors: 104

2	Door Closer (surface)	2970	EB	SA

Set: 4.0
Doors: 105, 112, 113, 115, 119, 120, 126

1	Door Harness	QC-C___P (as required)		MK
1	Frame Harness	QC-C1500 (as required)		MK
1	Electric Power Transfer	EL-CEPT		SU
2	Touch Bar	EL-TSB-BK		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU

Set: 5.0
Doors: 106, 109, 121, 122, 123, 129, 130, 131, 132, 304, 306, 307, 308, 401, 405

1	Motion Sensor	XMS (by security contractor)		SU
1	Position Switch	DPS-M-BK (by security contractor)		SU

Set: 6.0
Doors: 107, 124, 201, 203, 206

1	Exit Device	12 8815 ETL	US10B	SA
1	Door Closer	351 P10	EB	SA
1	Gasketing	S773D		PE

Set: 7.0
Doors: 108, 125

1	Exit Device	55 56 8710 306 x 862	US10B	SA
1	Exit Device	55 56 8710 862	US10B	SA
2	Door Harness	QC-C___P (as required)		MK
2	Frame Harness	QC-C1500 (as required)		MK
2	Electric Power Transfer	EL-CEPT		SU
1	Motion Sensor	XMS (by security contractor)		SU
2	Position Switch	DPS-M-BK (by security contractor)		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU

Set: 8.0
Doors: 116, 117, 202, 204, 303, 403

1	Exit Device	12 8713 ETL	US10B	SA
1	Exit Device	12 8710	US10B	SA
2	Concealed Closer	269 CSPS	EB	SA
2	Electromagnetic Holder	998	690	RF

Set: 9.0
Doors: 118

2	Exit Device	12 8715 ETL	US10B	SA
2	Door Closer	351 P10	EB	SA

Set: 10.0
Doors: 103

4	Hinge	TA2714 4-1/2" x 4-1/2"	US10B	MK
1	Cylindrical Lock (electrified w/REX)	ND80EL RHO N123-062	613	SC
1	Core	11 6300	US10	SA
1	Door Closer	351 PH10	EB	SA
1	Armor Plate	K1050 36" X 2" LDW BE CSK	US10B	RO
1	Threshold	271D		PE
1	Gasketing	2891DS		PE
1	Sweep	315DN		PE
1	Electric Power Transfer	CEPT-10		SU
1	Position Switch	DPS-M-BK (by security contractor)		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU

Set: 11.0
Doors: 110

6	Hinge	TA2714 4-1/2" x 4-1/2"	US10B	MK
1	Flush Bolt	2845	US10B	RO
1	Exit Device	12 8813 ETL 644	US10B	SA
1	Coordinator	2672	Black	RO
1	Filler Bar	FB-1	Black	RO
2	Mounting Bracket	2601AB/C	Black	RO
2	Door Closer	351 P10	EB	SA
1	Gasketing	S773D		PE

Set: 12.0
Doors: 402, 404, 406

1	Exit Device	12 8815 ETL	US10B	SA
1	Door Closer	351 P10	EB	SA

Set: 13.0
Doors: 127

2	Door Harness	QC-C___P (as required)		MK
2	Frame Harness	QC-C1500 (as required)		MK
2	Electric Power Transfer	EL-CEPT		SU
2	Touch Bar	EL-TSB-BK		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU

Set: 14.0
Doors: 305

1	Exit Device	8804 ETL	US10B	SA
1	Motion Sensor	XMS (by security contractor)		SU
1	Position Switch	DPS-M-BK (by security contractor)		SU

Set: 15.0
Doors: 111

3	Hinge	TA2714 4-1/2" x 4-1/2"	US10B	MK
1	Cylindrical Lock (storeroom)	ND80 RHO	613	SC
1	Core	11 6300	US10	SA
1	Wall Stop	409	US10B	RO
1	Gasketing	S773D		PE

Set: 16.0
Doors: 114

3	Hinge	TA2714 4-1/2" x 4-1/2"	US10B	MK
1	Cylindrical Lock (electrified w/REX)	ND80EL RHO N123-062	613	SC
1	Core	11 6300	US10	SA
1	Door Closer	351 P10	EB	SA
1	Gasketing	S773D		PE
1	Electric Power Transfer	CEPT-10		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU
1	Motion Sensor	XMS (by security contractor)		SU
1	Position Switch	DPS-M-BK (by security contractor)		SU

Set: 17.0
Doors: 128, 205

1	Cylindrical Lock (storeroom)	ND80 RHO	613	SC
1	Core	11 6300	US10	SA
1	Electric Strike	1006	613	HS
1	ElectroLynx Adaptor	2004M		HS
1	Frame Harness	QC-C1500 (as required)		MK
1	Motion Sensor	XMS (by security contractor)		SU
1	Position Switch	DPS-M-BK (by security contractor)		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU

Notes: Remove existing magnetic lock. Patch existing holes in frame and door.

Set: 18.0
Doors: EXD

1	Exit Device	8800 ETL (FUNCTION AS REQUIRED)	US10B	SA

Set: 19.0
Doors: OFF

180	Cylindrical Lock (entry)	ND53 RHO	613	SC
180	Core	11 6300	US10	SA

Set: 20.0
Doors: STR

93	Cylindrical Lock (storeroom)	ND80 RHO	613	SC
93	Core	11 6300	US10	SA

Set: 21.0
Doors: CYL

10	Cylinder	11 63 34/41	US10	SA

Notes: Remove existing cylinders and rekey as directed.

Set: 22.0
Doors: 301, 302, 309

1	Electric Exit Device	12 55 8875-24v ETL	US10B	SA
1	Door Closer	351 P10	EB	SA
1	Door Harness	QC-C___P (as required)		MK
1	Frame Harness	QC-C1500 (as required)		MK
1	Electric Power Transfer	EL-CEPT		SU
1	Power Supply	BPS-24-2 (by security contractor)		SU

Notes: Remove existing exit device and electric strike. Patch existing door and frame.

END OF SECTION

SECTION 08 8100

GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of glazing used in entries, doors, and windows.

B. Related Requirements:
   1. Sections Under 08 1000 Heading: Furnishing and installing of flush wood door lites in new doors.
   2. Section 08 4113: Furnishing and installing of glazing in aluminum-framed storefront.

1.2 REFERENCES

A. Association Publications:
   1. Glass Association of North America (GANA):
      a. *'Glazing Manual'*.
      b. '*Laminated Glass Design Guide'*.
      c. *'Engineering Standards Manual'*.
   2. The Insulating Glass Manufactures Alliance (IGMA):
      a. IGMA TB-3001 'Sloped Glazing Guidelines.
      b. SIGMA TM-3000 'Glazing Guidelines for Sealed Insulating Glass Units'.

B. Definitions:
   1. Airspace: Space between lites of insulating glass unit that contains dehydrated air or other inert specified gas.
   2. Emissivity: Ability of surface to absorb heat and to reflect it. Lower emissivity, the less room heat is absorbed and more heat is reflected back into the room.
   3. Float Glass: Glass which has its bottom surfaces formed by floating on molten metal, top surface being gravity formed, producing high optical quality of glass with parallel surfaces and, without polishing and grinding, fire-finished brilliance of finest sheet glass.
   4. Glass Surface:
      a. Insulated glass unit:
         1) Surface 1: Exterior surface of outer lite.
         2) Surface 2: Interspace-facing surface of outer lite.
         3) Surface 3: Interspace-facing surface of inner lite.
         4) Surface 4: Interior surface of inner lite.
      b. Monolithic glass:
         1) Surface 1: Exterior surface.
         2) Surface 2: Interior surface.
   5. Heat-Strengthened Glass: Glass which is reheated, after forming, just below melting point and then cooled. Compressed surface is formed which increases its strength. Used for spandrel glass.
   6. Insulation Glass: Two pieces of glass spaced apart and hermetically sealed to form single-glazed unit with air space between. Heat transmission through this type of glass may be as low as half that without air space. Also called double glazing, double pane, insulated unit, and thermal pane.
   7. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
   8. Low-Emissivity Glass (Low-E): Reduces wintertime heat loss from interior with thin, almost colorless metallic coating that reflects heat back inside structure. Allows moderate solar heat gain while reducing harmful ultraviolet light in any season. Minimizes summertime air

SECTION 08 8100

GLASS GLAZING

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   7. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
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conditioning loss by reflecting radiated heat to outside. May be tempered for where safety glass is required. Available in single strength clear, gray and bronze (brown) color.

9. Shading Coefficient: Ratio of solar heat gain passing through a glazing system to solar heat gain that occurs under the same conditions if the window was made of clear, unshaded double strength glass. Lower SC number, the better solar control efficiency of glazing system.
10. Solar Absorptance: Percent of incident solar radiation that is absorbed by window film/glass system. Lower the number, the less solar radiation absorbed.
11. Solar Heat Gain Coefficient (SHGC): Ratio of total solar heat passing through a given window relative to the solar heat incident on the projected window surface at normal solar incidence. (Percentage of solar energy directly transmitted or absorbed and re-radiated into a building). Lower SHGC, the better it is able to reduce heat.
12. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
13. Solar Transmittance (T): Percent of incident solar radiation that is transmitted through window film/glass system. Lower the number, the less solar radiation transmitted.
14. Spandrel Glass: Heat-strengthened float glass with colored-ceramic coating adhered to back by heat-fusing process. It has double the strength of annealed glass of same size and thickness, enabling it to withstand greater uniform loads and thermal stresses. Spandrel glass cannot be re-cut after heat-strengthening. Used as fixed opaque colored glass on buildings in front of floor slabs and columns and non vision areas. Available in wide array of colors.
    a. Ceramic Frit Opacification: Ceramic frit opacification consists of coating of durable, colored ceramic material that is compatible with base glass and is fire-fused into one surface of the glass during heat-treating process.
15. Tempered Glass: Glass strengthened through process of heating, creating tensile strength that causes glass to resist breakage, yet disintegrate into small pieces if break occurs. Tempered glass is type of safety glass.
16. Tinted Glass: Special type glass with additives, usually metallic particles that reduce passage of sunlight. Tinted glass can be bronze, gray, green or blue as well as other more exotic colors.
17. U-Factor: Overall heat transfer coefficient of glazing system. Measure of heat transfer that occurs through glazing system, and its outer and inner surfaces. This value is a function of temperature, and is expressed in BTU per square foot per hour per degree Fahrenheit (BTU/sq ft/hr deg F). Lower the U-Factor, the better insulation qualities of glazing system.
18. U-Value: Measurement of heat transfer through film due to outdoor/indoor temperature differences. Lower U-value, less heat transfers. When using performance data, the lower U-value, better insulating qualities of window film/glass system.
19. Ultraviolet Transmittance: Percent of ultraviolet light (UV) that is transmitted by window film/glass system. Lower the number, the less ultraviolet transmitted.
20. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

C. Reference Standards:
    1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / Canadian Standards Association:
        a. AAMA 800-10, ‘Voluntary Specifications and Test Methods for Sealants’.
    2. American National Standards Institute:
        a. ANSI Z97.1 Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test’.
    3. ASTM International:
        a. ASTM C1036-11, ‘Standard Specification for Flat Glass’.
        b. ASTM C1048-04, 'Standard Specification for Heat-Treated Flat Glass - Kind H, Kind FT Coated and Uncoated Glass’.
        c. ASTM C1172-09e1, ‘Standard Specification for Laminated Architectural Flat Glass’.
        d. ASTM C1281-03(2009), ‘Standard Specification for Preformed Tape Sealants for Glazing Applications’.
        e. ASTM E2190-10, ‘Standard Specification for Insulating Glass Unit Performance and Evaluation’.
    4. Canadian CAN/CGSB
        a. CAN/CGSB-12.1-M ‘Tempered or Laminated Safety Glass’.

b. CAN/CGSB 12.2-M 'Flat Clear Sheet Glass'.
c. CAN/CGSB-12.3-M 'Flat Clear Flat Glass'.

5. National Fenestration Rating Council (NFRC):
   a. NFRC 100 - Procedure for Determining Fenestration Product Thermal Properties.
   b. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence.
   c. NFRC 300 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products.
6. National Fire Protection Association (NFPA):
   a. NFPA 80 - Fire Doors and Windows.
   b. NFPA 252 - Fire Tests of Door Assemblies.
   c. NFPA 257 - Fire Test for Window and Glass Block Assemblies.
7. U.S. Consumer Product Safety Commission (CPSC):
   a. Code of Federal Regulations: 16 CFR 1201, 'Safety Standard For Architectural Glazing Materials'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's data sheets for each glass product and glazing material.
   2. Samples:
      a. Provide 12 inch (300 mm) by 12 inch (300 mm) sample for each glass type.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Glazing shall meet applicable requirements of Federal Consumer Product Safety Standard 16 CFR 1201.
   2. Comply with published recommendations of glass product Manufacturers and organizations, except where more stringent requirements are indicated.
   3. Glazing for Fire-Rated Door and Window Assemblies:
      a. Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

B. Qualifications:
   1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
      a. Satisfactorily completed at least three (3) installations of similar size, scope, and complexity in each of past two (2) years and be approved by glass product Manufacturer before bidding.
      b. Upon request, submit documentation.

C. Certifications:
   1. Labels showing strength, grade, thickness, type, and quality are required on each piece of glass.
   2. Manufacturers/Fabricators certifying products furnished comply with project requirements.
   3. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Follow Manufacturer's instruction for receiving, handling, and protecting glass & glazing materials to prevent breakage scratching, damage to seals, or other visible damage.
   2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage And Handling Requirements:
   1. Follow Manufacturer's instruction for storing and protecting glass & glazing materials.
   2. Store materials protected from exposure to harmful environmental conditions and at temperatures and humidity conditions recommended by Manufacturer.
   3. Protect edge damage to glass, and damage/deterioration to coating on glass.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
   1. Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

1.7 WARRANTY

A. Manufacturer Warranty:
   1. Insulating Glass Warranty:
      a. Manufacturer's standard form, signed by insulating-glass product Manufacturer/Fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by obstruction of vision by dust, moisture, or film on interior surfaces of glass, for ten (10) years of date of installation.
   2. Installer's Warranty:
      a. Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, for two (2) years from date of installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
   1. Manufacturer Contact List for Low E Glazing:
      a. AFG Industries, Kingsport, TN www.afg.com.
      b. Cardinal Glass Industries, Eden Praire, MN www.cardinalcorp.com
      c. Oldcastle BuildingEnvelope, Santa Monica, CA www.oldcastlebe.com.
      d. Pilkington North America Inc., Toledo, OH www.pilkington.com.
      e. PPG Industries, Pittsburgh, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.
      f. Versalux, Tulsa, OK www.versaluxglass.com.
      g. Other as approved by Architect before bidding. See Section 01 6200.

B. Storefront Glazing:
   1. Thickness: 1/4 inch (6 mm).
   2. Glazing shall have following characteristics:
      a. Low-Emissivity (or Low E):

1) Design Criteria:
   a) Clear:
   b) Insulated Glass: 1 inch (25 mm) units with 1/2 inch (13 mm) airspace and two (2) 1/4 inch (6 mm) lites.
   c) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
   d) Location: Surface 2.
2) Acceptable Product:
   a) Match Existing
3) Acceptable Manufacturers:
   a) AFG.
   b) Cardinal.
   c) Guardian.
   d) LOF.
   e) PPG.
   f) Visteon.
   g) Equal as approved by Architect before bidding. See Section 01 6200.

b. Glazing Below Door Height:
   1) Design Criteria:
      a) Tempered.
      b) Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

C. Laminated Glazing at Door 114:
   1. Thickness: 5/16 inch.
   2. Glazing shall have following characteristics:
      a. Design Criteria:
         1) Two plies of glass with .030 PVB interlayer.
         2) Outer ply: Mirrored
         3) Inner ply: Clear
         4) Tempered.
         5) Meet requirements of ASTM C1172-09e1, 'Standard Specification for Laminated Architectural Flat Glass'.
         6) Acceptable Manufacturers:
            a) AFG.
            b) Cardinal.
            c) Guardian.
            d) LOF.
            e) PPG.
            f) Viracon.
            g) Equal as approved by Architect before bidding. See Section 01 6200.

D. Fabrication:
   1. Except where glass exceeds 66 inches (1 675 mm) in width, cut clear glass so any wave will run horizontally when glazed.
   2. Sealed, Insulating Glazing Units:
      a. Double pane, sealed insulating glass units. Install at exterior windows and exterior aluminum-framed storefront.
      b. Unit Thickness: 5/8 inch (16 mm) minimum, one inch (25 mm) maximum.
      c. Type Seal:
         1) Metal-to-glass bond and separated by 1/2 inch (12.7 mm) dehydrated air space.
         2) Use non-hardening sealants.
      d. Approved Fabricators.
         1) Members of Sealed Insulating Glass Manufacturer's Association.

2.2 ACCESSORIES

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C1281 and AAMA 800 for application.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 09 0503

FLOORING SUBSTRATE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
1. Coordination and scheduling of Owner Furnished Testing for Alkalinity and Concrete Moisture Testing of concrete slab as described in Contract Documents.
2. Preparing floor substrate to receive flooring as described in Contract Documents.
3. Remove existing carpet and prepare floor as described in Contract Documents.

B. Related Requirements:
1. Pre-Installation conferences held jointly with Section 09 0503 as described in Administrative Requirements on Part 1 of this specification section.
2. Section 01 1200: Multiple contracts.
3. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
4. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
5. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
6. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
7. Section 01 7800: 'Closeout Submittals'.
8. Section 03 3111: Installation tolerances for concrete slabs.
9. Section 09 6813: Tile Carpeting.

1.2 REFERENCES

A. Association Publications:
1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
   a. ACI 302.2R-06, *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (August 15, 2006).
2. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
3. International Code Council (IBC):
   a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions (Following are specifically referenced for testing):
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Approved: To authorize, endorse, validate, confirm, or agree to.
3. Field Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
4. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
5. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with

approved construction documents and referenced standards. "Inspection" is not required by code provisions but may be required by Contract Documents. "Special inspection" is required by code provisions and by Contract Documents.
   a. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   b. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
6. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
7. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
8. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) whom will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
9. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
10. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
11. Service Provider: Agency or firm qualified to perform required tests and inspections.
12. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
13. Special Inspector: Certified individual or firm that implements special inspection program for project.
14. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship. "Test" is not required by code provisions but may be required by Contract Documents. "Special test" is required by code provisions and by Contract Documents.
15. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
   1. ASTM International (Following are specifically referenced for Testing Agencies):
      a. ASTM E329-09: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'
      b. ASTM E543-09, 'Standard Specification for Agencies Performing Nondestructive Testing.'
      c. ASTM E1212-09, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies.'
      d. ASTM F710-08, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
      e. ASTM F1869-10, 'Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.'
      f. ASTM F2170-09, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.'

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: In addition to agenda items required by the conditions of the contract, review following:
   1. Coordinate pre-installation conferences of all related flooring sections.
   2. Schedule conference after substrate preparation and TWO weeks before installation of flooring system. (If more than one flooring system is included on project, hold conference at same time if schedule permits).

3. Review condition of floor with regard to compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.

B. Scheduling:
1. Notify Testing Agency and Architect two weeks minimum before Pre-Installation Conference to allow testing for Concrete Moisture of concrete slab for each flooring system.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Manufacturer's product information, cut-sheets, and installation instructions for floor patching and leveling compound.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Testing and Inspection Reports:
a) Testing Agency Testing Reports of Alkalinity and Concrete Moisture testing.

1.5 QUALITY ASSURANCE

A. Testing and Inspection.
1. Owner will provide Testing for Alkalinity and Concrete Moisture of concrete slab before installation of flooring:
a. See Section 01 1200: 'Multiple Contract Summary'.

B. Qualifications:
1. Installer Qualifications:
a. Not less than 5 years experience in ceramic tile installations similar in size, scope, and installation procedures required for this project.
b. Shall have successfully completed manufacturer's installation training & submit copies of authorized certificate.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:
1. Provide storage space and protection for flooring and installation accessories if materials are delivered before start of flooring installation.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Coordinate with each flooring system specification section for ambient conditions required for each floor system.

B. Existing Conditions:
1. The owner will contract with an abatement contractor for removal of existing VCT and adhesive, under a separate contract, prior to the start of this contract.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Floor Leveling Compound:
   1. Portland cement based self-leveling.
   2. Acceptable Manufacturers:
      a. Ardex K-15 by Ardex.
      b. Levelayer 1 by Dayton / Richmond.
      c. Ultra / Plan or Ultra / Plan MB by Mapei.
      d. Equal as recommended by Carpet Manufacturer and approved by Architect before use. See Section 01600.

B. Floor Patching Compound:
   1. Portland cement based, polymer-modified.
   2. Acceptable Manufacturers:
      a. Ardex SD-P for patching with latex additive by Ardex.
      b. Plani / Patch by Mapei.
      c. Webcrete 98 by Durabond.
      d. Equal as recommended by Carpet Manufacturer and approved by Architect before use. See Section 01600.
      e. .

2.2 MANUFACTURERS

A. Contact Information:
   1. Ardex Inc, Coraopolis (Pittsburgh), PA (412) 264-4240. www.ardex.com
   2. Dayton / Richmond Concrete Accessories, Oregon, IL (800) 745-3707 or (937) 866-0711. www.daytonrichmond.com
   3. Durabond by Bostik Findley, Middleton, MA (978) 777-0100 www.bostikfindley-us.com
   4. Mapei, Garland, TX (800) 621-6491 or (972) 271-9500. www.mapei.com

PART 3 - EXECUTION

3.1 PREPARATION

A. Floor Preparation:
   1. Perform Moisture vapor emission tests of concrete slab in accordance with this section, and flooring manufacturer's recommendation.
   2. Concrete floor slab patching, skimming & leveling:
      a. Level 1 - Cracks, chips, holes, irregularities, and joints must be properly patched or repaired to provide a smooth level surface.
   3. Concrete surface cured, clean, dry, and free of foreign substances that will compromise flooring installations.
      a. Removal of curing compounds.
      b. Remove paint, sealer, grease, oil, silicone sealants, adhesive residue, and other materials incompatible with flooring adhesives.
      c. Removal of overspray from painted walls (essential so glue will stick).
   4. Vacuum and damp mop floor areas to receive flooring before flooring installation of each floor system.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
1. Concrete Moisture and Alkalinity:
a. Testing Agency will test interior concrete slabs before installation of floor coverings as directed by Architect and will include following:
1) Interior concrete slab areas to be tested:
a) Section 09 6813 'Tile Carpeting'.
2) Ambient Conditions: Testing conditions inside building shall be brought to same ambient temperature and relative humidity levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
b. Approved concrete moisture test. See Section 01 6200:
1) Relative Humidity (RH): In-Situ Testing of Concrete Relative Humidity:
a) Design Criteria:
(1) Verify relative humidity measuring instrument conforms to section 6 of ASTM F2170 (NIST-traceable calibration certificate is on file).
(2) Check calibration of measuring instrument per section 8 of ASTM F2170.
(3) Building ambient conditions are met before testing.
(4) Drill and prepare test holes per section 10.3 of ASTM F2170. (Drill holes equal to 40% of slab's thickness for slabs on grade and 20% of slab's thickness for suspended slabs).
(5) Verify seventy two (72) hour moisture equilibrium period for each test hole per section 10.3.4 of ASTM F2170.
(6) Perform relative humidity measurements per section 10.5 of ASTM F2170. Verify meter reading does not drift more than 1 % relative humidity over a five (5) minute period. Re-usable probes should equilibrate at least one (1) hour in each test hole.
b) Approved concrete moisture testing meter. See Section 01 6200:
(1) Wagneer RapidRH 4.0 Easy Reader with Touch-n-Sense Technology with Smart Sensors.
c. Alkalinity Testing (pH):
1) Test with pH meter or pH paper.
2) Testing shall be taken at every location and at each time concrete moisture test is performed as per ASTM F710.
3) Clean floor to remove all oil, dirt, dust and any floor coating or sealer. If surface has primer, sealer or old adhesive that might affect test procedure, it must be removed by lightly grinding, sanding or bead blasting. Do not remove more than 1/8 inch (3 mm) of concrete. Removal of more than 1/8 inch (3 mm) may give high pH reading. Failure to remove laitance will produce low, inaccurate pH reading.
4) Testing to be performed concurrently with concrete moisture testing.
d. Tests and Inspection Reports as covered in 'Testing Agency Services and Responsibilities' applies, but is not limited to following :
1) Record and report results per section 11 of ASTM F2170.
2) Test Report will include following:
a) Identify Building slab location of each test.
b) Including type of flooring system to be installed at each test location.
c) Test results of each test given.
3) Test Report shall be given to Architect, Contractor, Owner's Representative and Flooring Installer(s) before Pre-Installation Conference as described in Administration Requirements of each floor system Section and included in closing submittals.

END OF SECTION

B L A N K PA G E

SECTION 09 2216

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal framing and furring systems and blocking as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C 645-06, 'Standard Specification for Nonstructural Steel Framing Members.'

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Show special components and installations not fully dimensioned or detailed in Manufacturer's Product data.

B. Informational Submittals:
   1. Test And Evaluation Reports: ICBO Evaluation Report:
   2. Manufacturer Instructions: Technical product data, installation instructions, and recommendations for each component of system.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: ICBO approved.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Contact List:
      a. Allied Studco Inc, Phoenix, AZ www.studco.com.
      b. CEMCO, City of Industry, CA www.cemcosteel.com.
      c. Clark Western, Cincinnati, OH www.clarksteel.com.
      d. Dietrich Industries Inc, Pittsburgh, PA www.dietrichindustries.com.
      e. Steeler Inc, Seattle, WA www.steeler.com.

B. Materials:
   1. Framing:
      a. 20 ga 0.95 mm minimum, unless noted greater on Drawings, meeting requirements of ASTM C 645.

b. Tracks, bridging, blocking, strapping, and other accessories shall be as described in Contract Documents or as required by Manufacturer's system.
c. Type One Acceptable Products:
   1) 3-5/8 IC 20 ga by American Studco.
   2) 362DS20P by CEMCO.
   3) Drywall Metal, 20 ga only, by Clark Western.
   4) 20 Ga STE by Dietrich Industries.
   5) 20 Ga 3-5/8 SS Series by Steeler Inc.
   6) Any member of Steel Stud Manufacturer's Association (SSMA).
   7) Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
   1. Coordinate with other Sections to provide blocking necessary for their work.
   2. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties.

B. Tolerances:
   1. 1/4 inch 6 mm in 20 feet 6 meters, non-cumulative in length of wall.
   2. 1/8 inch 3 mm in 10 feet 3 meters with 1/4 inch 6 mm maximum in height of wall.
   3. Distances between parallel walls shall be 1/4 inch 6 mm maximum along length and height of wall.

C. Framing:
   1. Specifications of Stud Wall Manufacturer shall govern this work unless more stringent requirements are required by Contract Documents.
   2. Use grommets at framing penetrations where unsecured items pass through.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.

1.2 REFERENCES

A. Definitions:
   1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
   2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
   3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.
   4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.

B. Reference Standards:
   1. ASTM International:
      a. ASTM C11-10, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems.'
      b. ASTM C475/C475M-02(2007), 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.'
      c. ASTM C840-08, 'Standard Specification for Application and Finishing of Gypsum Board.'
      d. ASTM C1002-07, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.'
      e. ASTM C1047-10, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.'
      f. ASTM C1178/C1178M-08, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.'
      g. ASTM C1396/C1396M-09a, 'Standard Specification for Gypsum Board.'
      h. ASTM E84-10, 'Standard Test Method for Surface Burning Characteristics of Building Materials.'
      i. ASTM E119-10a, 'Standard Test Method for Fire Tests of Building Construction and Materials.'
   2. Gypsum Association:
      a. GA-214-07e, 'Recommended Levels of Gypsum Board Finish.'
      b. GA-216-07: 'Application and Finishing of Gypsum Panel Products.'
      c. GA-600-09, 'Fire Reference Design Manual.'
      d. GA-801-07, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors.'
   3. Underwriters Laboratories, Inc.

a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials.'
b. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials; Tenth Edition September 10 2008.'

1.3 DELIVERY, STORAGE, AND HANDLING

A. General:
1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.

B. Delivery And Acceptance Requirements:
1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.

C. Storage And Handling Requirements:
1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

1.4 FIELD CONDITIONS

A. Ambient Conditions:
1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
a. Do not install interior products until installation areas are enclosed and conditioned.
1) Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
2) Provide ventilation to eliminate excessive moisture.
3) Avoid hot air drafts that will cause too rapid drying.
b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
1. Manufacturer Contact List:
a. American Gypsum, Dallas, TX www.americangypsum.com.
b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
c. Georgia Pacific, Atlanta, GA www.gp.com.
d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
e. Pabco Gypsum, Newark, CA www.pabcogypsum.com.
f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:
1. Interior Gypsum Board:
a. General:
1) Size:
a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2) Class Two Quality Standard:
   a) Core: Fire-resistant rated gypsum core.
   b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
   c) Surface paper: Face paper suitable for painting.
   d) Long edges: Tapered edge.
   e) Overall thickness: 5/8 inch (15.9 mm).

2.2 ACCESSORIES

A. Manufacturers:
   1. Manufacturer List:
      a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
      b. Magnum Products, Lenaxa, KS www.levelcoat.com.
      c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
      d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
      e. United States Gypsum Co, Chicago, IL www.usg.com.
      f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
      g. Wm. Zinsser & Co, Somerset, NJ www.zinsser.com.
   2. Gypsum Board Mounting Accessories:
      a. Quality Standards.
         1) Furring Channels:
            a) Walls: Galvanized DWFC-25.
            b) Ceilings: Galvanized DWFC-20.
         2) Accessories as required by Manufacturer's fire tests to provide necessary fire ratings.
   3. Corner And Edge Trim:
      a. Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.
   4. Joint Compound:
      a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
         1) Use Taping Compound for first coat to embed tape and accessories.
         2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
         3) Use Finishing Compound for final coat and for skim coat.
   5. Joint Reinforcing:
      a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
   6. Fasteners:
      a. Bugle head screws meeting requirements of ASTM C1002:
         1) Gypsum Board:
            a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing 5/8 inch (15.9 mm) minimum.
         2) Glass Mat Gypsum Tile Backer:
            a) Wood Framing: 11 ga (0.1233 in) (3.1318 mm), galvanized with 7/16 inch (11 mm) head, hot dipped. Screws: Type W or Type S Hi-Lo, bugle head, rust resistant.

B. Primer / Surfacer On Surfaces To Receive Texturing:
   1. Acceptable Products:
      a. Sheetrock First Coat by USG.
      b. Prep Coat by Westpac Materials.
      c. Level Coat by Magnum Products.
      d. Equal as approved by Architect before bidding. See Section 01 6200.

C. Primer On Surfaces To Receive Wallcovering:
   1. White, self-sizing, water based, all purpose wallcovering primer.
   2. Acceptable Products:

a. Shieldz Universal Pre-Wallcovering Primer by Wm. Zinsser and Company.
b. Equal as approved by Architect before application. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Examine substrate and verify framing is suitable for installation of gypsum board.
2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
3. Notify Architect of unsuitable conditions in writing.
a. Do not install board over unsuitable conditions.
4. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Interface With Other Work:
1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
2. Do not install gypsum board until required blocking is in place.

B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.

C. Interior Gypsum Board:
1. General:
a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over 1/8 inch (3 mm) wide before taping are acceptable.
b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
2. Single Layer Application:
a. Apply ceilings first using minimum of two men.
b. Use board of length to give minimum number of joints.
c. On walls over 108 inches (2 700 mm) high and on ceilings, apply board perpendicular to support.
d. Stagger end joints. End and edge joints of board applied on ceilings shall occur over framing members or be back blocked with 2x4 (38 mm by 89 mm) blocking. End joints of board horizontally applied on walls shall occur over framing members. Edge joints of board vertically applied on walls shall occur over framing members.
e. Butt edges in moderate contact. Do not force in place. Shim to level.
f. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
g. Scribe work closely. Keep joints as far from openings as possible. If joints occur near an opening, apply board so vertical joints are centered over openings. No vertical joints shall occur within 8 inches (200 mm) of external corners or openings.
h. Install board tight against support with joints even and true. Tighten loose screws.
i. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.
3. Fastening:
a. Apply from center of board towards ends and edges.
b. Apply screws 3/8 inch (9.5 mm) minimum from ends and edges, one inch (25 mm) maximum from edges, and 1/2 inch (13 mm) maximum from ends.

c. Spacing:
   1) Ends: Screws not over 7 inches (175 mm) on center at edges where blocking or framing occurs.
   2) Wood Framed Walls And Ceilings: Screws 7 inches (175 mm) on center in panel field.
   3) Metal Framed Walls: Screws 12 inches (300 mm) on center in panel field.
d. Set screw heads 1/32 inch (0.8 mm) below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw 2 inches (50 mm) away.
e. Screws on adjacent ends or edges shall be opposite each other.
f. Drive screws with shank perpendicular to face of board.

4. Trim:
   a. Corner Beads:
      1) Attach corner beads to outside corners.
         a) Attach metal corner bead with staples spaced 4 inches (100 mm) on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
         b) Set paper-faced trim in solid bed of taping compound.
   b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames 1/8 inch (3 mm) to allow for caulking.

5. Finishing:
   a. General:
      1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
      2) First Coat:
         a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
         b) Completely fill gouges, dents, and fastener dimples.
         c) Allow to dry and sand lightly if necessary to eliminate high spots or excessive compound.
      3) Second Coat:
         a) Apply coat of specified joint compound over embedded tape extending 3-1/2 inches (88 mm) on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
         b) Re-coat gouges, dents, and fastener dimples.
         c) Allow to dry and sand lightly to eliminate high spots or excessive compound.
      4) Third Coat: Apply same as second coat except extend application 6 inches (150 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
      5) Fourth Coat: Apply same as second coat except extend application 9 inches (425 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
   a. Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-216 or GA-214:
      1) Gypsum Board Surfaces not painted or finished:
         a) GA-214-07e Level 1: ‘All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.’
      2) Gypsum Board Surfaces to Receive Vinyl Wall Covering, Acoustic Wall Carpeting, Multi-Color Coating System, and Painted Texturing, and Smooth Gypsum Board Surfaces:
         a) GA-214-07e Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All

joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer.'

3) Painted, Untextured Gypsum Board Surfaces, Except in Mechanical, Storage, And Utility Areas:
   a) GA-214-07e Level 5: 'All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer.'

D. Glass Mat Gypsum Tile Backer:
   1. Apply glass mat gypsum tile backer to framing. Attach using specified fasteners spaced 6 inches (150 mm) on center on edges and into all framing members. Drive screws flush with surface of board.
   2. Shim board to be plumb and flat or level and flat, depending on location.
   3. Apply reinforcing only at joints where abutting different materials.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
      a. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
      b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.4 CLEANING

A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

SECTION 09 6813

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But Is Not Limited To:
   1. Coordination, sequencing, and scheduling for installation of walk-off carpet tile as described in contract documents and including following:
      a. Schedule Testing Agency testing of Alkalinity and Concrete Moisture of concrete slab before pre-installation conference.
      b. Maintain Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.

B. Products Furnished and Installed Under This Section:
   1. Carpet Tiles.

C. Related Requirements:
   1. Section 01 1200: 'Multiple Contracts'.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 7800: 'Closeout Submittals'.
   7. Section 03 3111: Provision of acceptable concrete substrate.
   8. Section 09 0503:
      a. Floor substrate preparation.
      b. Field Testing for Alkalinity and Concrete Moisture of concrete slab.
      c. Pre-installation conference for Sections under 09 6000 heading 'Flooring.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 302.2R-06, *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (August 15, 2006).
   2. NSF International (NSF) / American National Standards Institute (ANSI):
      a. NSF International, Ann Arbor, MI www.nsf.org
         1) (NSF) / ANSI 140-2009, 'Sustainable Assessment for Carpet'.
   3. The Carpet and Rug Institute (CRI), Dalton, GA www.carpet-rug.org. Standard for Installation Specification of Commercial Carpet:
      a. CRI Carpet Installation Standard – 2011 (First Edition).
      b. CRI Indoor Air Quality (IAQ):
         1) CRI Green Label Plus Certification.
      c. CRI Texture Appearance Retention Rating (TARR):
         1) Retention Rating Scales.

B. Definitions:

1. Adhesive: Substance that dries to film capable of holding materials together by surface attachment.
2. Antimicrobial: Chemical treatment added to carpet or reduce growth of common bacteria, fungi, yeast, mold and mildew.
3. Appearance Retention: Ability of a fabric to retain its original aesthetics, color, and construction integrity.
4. Backing: Materials comprising back of carpet as opposed to carpet pile or face.
   a. Tufted carpets: (1) Primary backing, woven or nonwoven fabric in which pile yarn is inserted by tufting needles. (2) Secondary backing, Fabric laminated to back of carpet to reinforce and increase dimensional stability.
   b. Woven carpets: Backings are 'construction yarns' comprising chain warp, stuffer warp, and shot or fill, which are interwoven with face yarn during carpet fabric formation.
5. Backing Fabric: Fabric into which pile yarn is inserted, or reinforcing layer that is adhered to reverse side of fabric.
6. Bonding Agent (Backcoating): Application of latex or adhesive to back of carpet to anchor tufts usually followed immediately by addition of secondary backing material such as nonwoven polypropylene or poly-urethane attached cushion.
7. Carpet: Heavy fabric used to cover floor and made from variety of fibers.
8. Change In Surface Appearance: Cumulative change in surface appearance between unexposed and exposed specimens due to crushing, loss of tuft definition, and matting.
9. Colorfastness: Ability of fiber or carpet to retain color when exposed to (1) ultraviolet light, (2) crocking (wet or dry) and (3) atmospheric conditions.
10. Commercial Match: Matching of colors with acceptable tolerance, or with color variation that is barely detectable to naked eye.
11. Crockfastness: Resistance of transfer of colorant from surface of colored yarn or fabric to another surface, or to an adjacent area of same fabric, principally by rubbing.
12. Crushing: Collapsing of pile yarns, resulting in carpet matting and loss of resilience due to traffic.
13. Delamination: Form of deterioration of tufted carpet in which primary back and face yarns separate from secondary back.
14. Density: Amount of pile yarn per area of carpet or closeness of tufts. Higher density carpet improves resistance to crushing and matting.
15. Dimensional Stability: Ability of carpet to retain its size and shape once installed.
16. Face Weight: Total weight of face (above backing) yarns in carpet.
17. Fiber: Fundamental unit of carpet made from nylon, polyester, cotton, acrylics, wool, and recycled material.
18. Flammability: Procedures that have been developed for assessing flame resistance of carpets.
19. Fuzzing: Fluffy particles appear on carpet surfaces caused by fibers that loosen because of weak twist or snags.
20. Lightfastness: Degree of resistance of dyed textile materials to color destroying influence of sunlight.
21. Loss of Tuft Definition: Bursting, opening, and untwisting of pile yarn and/or decrimping of fibers in surface pile of pile yarn floor covering.
22. Matting: Loss of pile definition of a textile floor covering due to entanglement and compression of pile fibers.
23. Modification Ratio: Ratio between circumference of inner core of multi lobal fiber's cross section, and circumference of circle drawn around outer edges of fibers cross sections' outer lobes or tips.
24. Pile: Visible surface of carpet, consisting of yarn tufts in loop and/or cut configuration. Sometimes called face or nap.
25. Resilience: Ability of carpet to spring back to its original texture and thickness after being walked on or compressed weight of furniture.
26. Soil Resistance: Ability of carpet fiber to resist dry soil and maintain its original appearance after intermittent or restorative cleanings.
27. Soiling: Occurs when dirt particles build up in carpet fibers.
28. Stain Resistance: Ability of carpet fiber to resist absorption of stain and maintain its original appearance.
29. Texture: Visual and tactile surface characteristics of carpet pile, including such aesthetic and structural elements.

30. Texture Appearance Retention Rating (TARR): Model specification process that classifies areas of intended use and minimum carpeting texture appearance retention ratings for particular areas of use. Moderate, heavy, severe, or special end-use classification is established for each application based on level of expected foot traffic in specific areas.
31. Tile: Carpet module usually 18 inch x 18 inch or 24 inch x 24 inch (450 mm x 450 mm or 600 mm x 600 mm) in size. Extremely dense construction with heavy reinforced backing.
32. Tuft: Cluster of yarns drawn through fabric and projecting from surface in form of cut yarns or loops.
33. Tuft Bind: Force (usually measured in pounds) required to pull tuft from carpet backing.
34. Tufted Carpet: Carpet produced by tufting machine instead of loam.
35. Twist: Winding of yarn around itself. More twist improves carpet performance (especially in cut pile).
36. Woven Carpet: Carpet produced on a loom.
37. Woven: Interlacing strands of fiber into yarn forms woven carpet.
38. Yarn: Fibers that are twisted together to form a continuous strand.

C. Reference Standards:
   1. ASTM International:
      a. ASTM F2170-11, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.'

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate completion of flooring installation with other trades.

B. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 09 0503.
   2. In addition to agenda items specified in Section 01 3100 and Section 09 0503, review following:
      a. Schedule conference after substrate preparation and ONE (1) week minimum before installation of flooring system.
      b. Review Testing Agency testing report of Alkalinity and Concrete Moisture of concrete slab.
         1) See Section 09 0503 for Options if concrete moisture tests of concrete slab exceeds Alkalinity and Concrete Moisture requirements for flooring.
      c. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
      d. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
      e. Review cleaning and disposal requirements.
      f. Review protection requirements of carpet after installation of carpeting.

C. Scheduling:
   1. Notify Testing Agency and Architect ONE (1) week minimum pre-installation conference to allow testing for Alkalinity and Concrete Moisture of concrete slab.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data
   2. Samples

B. Informational Submittals:
   1. Manufacturer Instructions:
      a. Published installation instructions.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Warranty Documentation:
1) Final, executed copy of Warranty.
b. Record Documentation:
1) Manufacturers documentation:
a) Manufacturer's literature.
b) Color and style selection.
2) Testing and Inspection Reports:
a) Testing Agency Testing Reports of Alkalinity and Concrete Moisture testing.

D. Maintenance Material Submittals:
1. Extra Stock Materials:
a. Leave carpet tiles equivalent to 15 percent of number installed as attic stock.
b. Tie securely and wrap in protective cover.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. All products provided will meet requirements of all federal, state, and local codes having jurisdiction.
2. Label meeting Federal Labeling Requirements, as stated in Textile Products Identification Act under Federal Trade Commission, shall be attached to certification samples and products delivered.

B. Testing and Inspection.
1. Owner will provide Testing for Alkalinity and Concrete Moisture of concrete slab before installation of flooring:
a. See Section 01 1200: ‘Multiple Contract Summary’.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver materials and accessories necessary for completion of carpet installation to site before beginning installation of carpet.
2. Do not deliver materials before date scheduled for installation.

B. Storage And Handling Requirements:
1. Store carpet and related materials in a climate-controlled, dry space.
2. Protect carpet from soil, dust, moisture and other contaminants.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Building Conditions:
a. Conditions inside building shall be brought to levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
1) Carpet installation is not to begin until HVAC system is operational and following conditions are maintained for at least forty eight (48) hours before, during and seventy two (72) hours after completion:
a) Carpet is to be installed when indoor temperature is between 65º - 95º F (18º - 35º C) with maximum relative humidity of 65%.
b) Substrate surface temperature should not be less than 65º F (18º C) at time of installation.

c) Do not allow temperature of indoor carpeted areas to fall below 50º F (10º C), regardless of age of installation.

2) Maintain fresh air ventilation after installation for seventy two (72) hours minimum or until lingering odors are gone.

2. Alkalinity:
   a. Do not install carpet tiles if alkalinity of concrete surface exceeds pH level 9. Corrective procedures are required.
3. Concrete Moisture (either test method acceptable)
   a. Testing conditions inside building shall be brought to same ambient temperature and relative humidity levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning.
   b. Do not install carpet tiles if moisture vapor emission rate (MVER) concrete slab relative humidity (RH) exceeds 75% as per ASTM F2170. Corrective procedures are required.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Provide Carpet Manufacturer's standard Warranty.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Match carpet being installed in other parts of the building under separate contract.
   1. Contact Stan Clark (801.694.4905) at Wall 2 Wall. Reference state contract – MA2097.

B. Materials:
   1. Carpet Tiles (walk-off) Vestibules only.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify concrete surfaces are sufficiently cured and moisture content is within acceptable levels before beginning installation as specified in Section 09 0503, 'Floor Substrate Preparation'. If test results exceed limitations, do not proceed with installation, until problem has been corrected.
      a. Notify Owner's Representative in writing if floor surface is not acceptable to install carpet.
      b. Do not lay carpeting over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

B. Evaluation And Assessment:
   1. Variation In Grade:
      a. Plus or minus 1/8 inch (3 mm) in any 10 foot (3 meter) of floor slab and distance between high point and low point of slab of 1/2 inch (13 mm).
   2. Testing Procedure:
      a. Place ends of straightedge on 3/8 inch (10 mm) high shims.
      b. Floor is satisfactory if 1/4 inch (6 mm) diameter steel rod rolled under straightedge will not touch anywhere along 10 foot (3 meter) length and 1/2 inch (13 mm) diameter steel rod will not fit under straightedge anywhere along 10 foot (3 meter) length.
   3. Notify Owner's Representative in writing if floor surface is not acceptable to install carpet.

a. Do not lay carpet over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

3.2 PREPARATION

A. Flooring Preparation:
1. Prepare floor substrate in accordance with 'CRI Carpet Installation Standard' best practices to receive carpet installation and to provide installation that meets warranty requirements.
2. Verify concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or installation.
3. Concrete floor slab patching:
   a. Cracks, chips and joints must be properly patched or repaired.
4. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations.
   a. Removal of curing compounds.
   b. Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
   c. Removal of overspray from painted walls (essential so glue will stick).
5. Moisture vapor emission tests and alkalinity test of concrete slab has been preformed.
6. Vacuum and damp mop floor areas to receive flooring before flooring installation.

B. Relaxing / Conditioning Carpet:
1. Protect carpet adequately from soil, dust, moisture and other contaminants.
2. Sundry items, such as adhesives, should also be conditioned.

3.3 INSTALLATION

A. Carpet:
1. General:
   a. Install carpet and carpet base in accordance with 'CRI Carpet Installation Standard' and Manufacturer's written instructions supplied with product.
   b. Adhesion of carpet cushion (or secondary backing) to floor substrate and adhesion of carpet primary and secondary backings shall be continuous on floor surface so there are no bubble, ridges, or any separation of carpet from backings or backing from floor substrate caused by failure of carpet, backings or cushion, and adhesives as a system.
   c. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.

B. Resilient Base And Accessories:
1. Install in manner to produce smooth, even finished surfaces tightly jointed and accurately aligned.
2. Fit specified items tightly. Use fillers where necessary. Fit neatly against projections, piping, electrical service outlets, etc.
3. Secure specified items with specified adhesive. Cement substantially to vertical surfaces including rubber base to cabinet work base.
4. Line up top and bottom lines of base throughout.
5. Roll until firm bond has been established. Leave level, free from buckles, cracks, and projecting edges.

3.4 FIELD QUALITY CONTROL

A. Field Tests:
1. See Section 09 0503 'Flooring Substrate Preparation' for Field Testing for Alkalinity and Concrete Moisture of concrete slab.

B. Field Inspections:
   1. Unacceptable carpet after installation shall include but not be limited to:
      a. Delaminating carpet from backings.
      b. Fiber loss less than specified.
      c. Edge raveling.
      d. Fuzzing of carpet fibers.
      e. Pilling of carpet fibers.
      f. Appearance retention less than control samples attached to Agreement.
      g. Dye bleeding.
      h. Zippering fibers in carpet.
      i. Color streaking.
      j. Irregular tufts of fiber.
   2. Unacceptable workmanship shall include but not be limited to:
      a. Improper floor preparation before installation.
      b. Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
      c. Seams that do not comply with specified requirements.
         1) Raveled or untrimmed seams.
         2) Seams not sealed, level, straight, or even.
         3) Open seams.
         4) Seams visibly open when viewed by Project Manager from standing position.
      d. Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
      e. Use of unspecified carpet.
      f. Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
      g. Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
      h. Carpet base that is not scribed to fit against floor with no gaps.
      i. Carpet base attached by means other than acceptable carpet base adhesive.

C. Non-Conforming Work:
   1. Unacceptable Carpeting:
      a. Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner.

3.5 CLEANING

A. General:
   1. Remove any soiling and/or staining from carpet.
   2. Remove excessive adhesive with manufacturer recommended adhesive removers.

B. Damage to building:
   1. Carpet Installer responsible for cleaning and repair of all damaged surfaces to their original condition from carpet installation.

C. Waste Management:
   1. Contractor’s Responsibility:
      a. Provide Dumpster as specified in Section 01 7400.
      b. All work areas are to be kept clean, clear and free of debris at all times.
      c. Disposal of rubbish, wrapping paper, scraps, and trimmings.

3.6 PROTECTION

A. Protection of Carpeting:

1. Contractor's Responsibility:
   a. No traffic of any kind on newly installed carpet for minimum of twenty four (24) hours after installation is completed.
   b. No wheeled traffic of any kind placement of furniture or equipment on carpet for minimum of forty eight (48) hours after completion of carpet installation.
   c. Protect carpet adequately from soil, dust, moisture and other contaminants after carpet installation.
   d. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.

END OF SECTION

SECTION 09 9001

COMMON PAINTING AND COATING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common procedures and requirements for field-applied painting and coating.

B. Related Requirements:
   1. Section 05 0503: Quality of shop priming of steel and iron.
   2. Section 07 9213: Quality of Elastomeric Joint Sealants.

1.2 REFERENCES

A. Definitions:
   1. Gloss Levels:
      a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level ‘1’	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level ‘2’	High hide sheen flat - 'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘3’	Traditional 'eggshell-like finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘4’	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level ‘5’	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level ‘6’	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level “7’	High gloss	More than 85 units at 60 degrees.

   2. Properly Painted Surface: Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
   3. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
   4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

B. Reference Standards:
   1. Master Painters Institute:
      a. MPI(a), Jul 2007, 'Architectural Painting Specification Manual.'
      b. MPI(r), Aug 2004, 'Maintenance Repainting Manual.'

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference specified in Section 09 2900 to review finish requirements of gypsum wallboard.
   2. Schedule painting pre-installation conference after delivery of paint but before or at same time as application of field samples.
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Review painting schedule.
      b. Review safety issues.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Include following information for each painting system, arranged in same order as in Project Manual.
         1) Manufacturer's cut sheet for each component of each system indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
         2) Copies of appropriate entries from MPI Approved Product List. Products from MPI Approved Product List is mandatory for Sections 09 9112, 09 9123 and 09 9124. If proposed manufacturer has products listed for these three Sections, but not for other Sections, Architect may approve products submitted by proposed manufacturer for other Sections.
         3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
   2. Samples: Provide two 4 inch by 6 inch (100 mm by 150 mm) minimum draw-down cards for each paint or coating color selected for this Project.

B. Informational Submittals:
   1. Manufacturer Instructions:
      a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturer’s documentation:
            a) Manufacturer's cut sheet for each component of each system.
            b) Schedule showing rooms and surfaces where each system was used.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
   2. Deliver amount of materials necessary to meet Project requirements in single shipment.

B. Storage And Handling Requirements:
   1. Store materials in single place.
   2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
   3. Maintain storage area at 55 deg F (13 deg C) minimum.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product.
   2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted. Inspection of painting work shall take place under same lighting conditions as application. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:
   1. Design Criteria:
      a. Color Levels:
         1) Color Level II:
            a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-09 as modified in following paragraph.
            b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.

B. Materials:
   1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
   2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

PART 3 - EXECUTION

3.1 APPROVED APPLICATORS

A. Applicator shall have experience in application of specified products for five years minimum and be acceptable to Architect and Paint Manufacturer.

3.2 EXAMINATION

A. Verification Of Conditions:
   1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections

and are complete and ready for application of painting and coating systems as specified in those Sections.

B. Pre-Installation Testing:
   1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.
   2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
   3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.

C. Evaluation And Assessment:
   1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

3.3 PREPARATION

A. Protection Of In-Place Conditions:
   1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
      a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.
      b. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.
      c. On existing work where ceiling is to be painted, speakers and grilles are already installed, and ceiling color is not being changed, mask off metal grilles installed on ceiling speakers. If ceiling color is being changed, remove metal grilles and paint, and mask off ceiling speakers.

B. Surface Preparation:
   1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
   2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
   3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
   4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
   5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

3.4 APPLICATION

A. Interface With Other Work:
   1. Coordinate with other trades for materials and systems that require painting before installation.
   2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.

B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.

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1. Paint mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents. These include but are not limited to:
   a. Gas pipe from gas meter into building.
   b. Mechanical flues and pipes penetrating roof.
   c. Electrical panel and disconnect enclosures.
   d. Metal protective structures for refrigerant lines.
2. Paint inside of chases in occupied spaces flat black for 18 inches (450 mm) or beyond sightline, whichever is greater.

C. Apply sealant in gaps 3/16 inch (5 mm) and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.

D. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.

E. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.

F. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.

G. Touch up suction spots after application of first finish coat.

H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.

I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.

J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.

K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

3.6 CLEANING

A. General:
1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.

B. Waste Management:
1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
2. Remove debris caused by work of paint Sections from premises.

END OF SECTION

B L A N K P A G E

SECTION 09 9123

INTERIOR PAINTED GYPSUM BOARD, PLASTER

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing, priming, and finish painting interior gypsum board and plaster surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: Priming new interior gypsum board surfaces to receive sheet wall covering system and texturing.
   2. Section 09 9001: Common Painting Requirements.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Approved Manufacturers and Products.
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. All Rooms:
      a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system
      b. Previously Finished Surfaces: Use MPI(r) RIN 9.2B Latex Finish system.

C. Performance:
   1. Design Criteria:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
      c. Sound Existing Surfaces: MPI Custom Grade requirements.
      d. Gloss / Sheen Required:
         1) Match existing and/or adjacent surface.

D. Materials:
   1. Primers
      a. MPI Product 50.
   2. Finish Coats:
      a. All Rooms:
         1) Buildings with only Gypsum Board surfaces in rooms:
            a) MPI Product 141, 'Latex, Interior, High Performance Architectural.

PART 3 - EXECUTION

3.1 APPLICATION

A. General: See appropriate paragraphs of Section 09 9001.

B. New Surfaces:
   1. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.

C. Existing Painted Surfaces:
   1. Remove deteriorated existing paint down to sound substrate by scraping or sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces.
   2. Clean surface with mild soap and water, or with tri-sodium phosphate (TSP). Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
   3. Spackle and tape cracks. Sand to smooth finish and spot prime.
   4. Sand or chemically etch existing painted surface as required to prepare surface to accept new paint.
   5. Re-clean surface.
   6. Apply primer coat.
   7. Apply finish coats.

END OF SECTION

SECTION 260500 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Supporting devices for electrical components.
   2. Permits and Fees.

1.3 COORDINATION

A. Coordinate communication service connections to components furnished by communication utility companies.
   1. Coordinate installation and connection of exterior underground and overhead utilities and services.
   2. Comply with requirements of authorities having jurisdiction.
   3. Notify Architect a minimum of seven days in advance of any proposed utility interruption and obtain approval prior to proceeding. Comply with requirements of the Owner, User, and Utility.
   4. Include all costs, including Owner, municipal or utility costs that will need to be paid to obtain communication services.

B. Coordinate with Authorities Having Jurisdiction including: city, county, state, university, federal and other governmental authorities.
   1. Obtain all permits (including excavation permits) prior to beginning construction.
   2. Pay all fees.
   3. Request inspections required by Authorities Having Jurisdiction in a timely manner and in order to comply with sequencing requirements.

PART 2 - PRODUCTS

2.1 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.

B. For Nonequipment Surfaces: Matching type and color of undamaged, existing adjacent finish.

C. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT

A. Install equipment according to utility company's written requirements. Provide grounding as required by utility company.

B. Remove rubbish, waste, and excess soils.

3.2 TEMPORARY ELECTRICAL AND COMMUNICATIONS SERVICE

A. Electrical Contractor is to provide and coordinate electrical and communications service at the construction site. Contractor to coordinate temporary power and communications connections with the respective utility.

B. Electrical Contractor is responsible for any fees associated with the temporary power connection.

3.3 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work.
1.

END OF SECTION 260500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1. Section 260513 "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.
2. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2 and 3 control cables.
3. Section 271500 "Communications Horizontal Cabling" for cabling used for voice and data circuits.

1.3 DEFINITIONS

A. VFC: Variable frequency controller.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THW-2 Type THHN-2-THWN-2 Type XHHW-2 Type UF Type USE and Type SO.

D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for armored cable, Type AC metal-clad cable, Type MC mineral-insulated, metal-sheathed cable, Type MI nonmetallic-sheathed cable, Type NM Type SO and Type USE with ground wire.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. AFC Cable Systems, Inc.
   2. Hubbell Power Systems, Inc.
   3. O-Z/Gedney; EGS Electrical Group LLC.
   4. 3M; Electrical Products Division.
   5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger, except VFC cable, which shall be extra flexible stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.

B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway.

C. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.

C. Test and Inspection Reports: Prepare a written report to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes grounding and bonding systems and equipment.
   1. Underground distribution grounding.
   2. Ground bonding common with lightning protection system.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70 for grounding and bonding of electrical systems.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Burndy; Part of Hubbell Electrical Systems.
   2. Dossert; AFL Telecommunications LLC.
   3. ERICO International Corporation.
   4. Fushi Copperweld Inc.
   5. Galvan Industries, Inc.; Electrical Products Division, LLC.
   6. Harger Lightning and Grounding.
   7. ILSCO.
   8. O-Z/Gedney; A Brand of the EGS Electrical Group.
   9. Robbins Lightning, Inc.
   10. Siemens Power Transmission & Distribution, Inc.

2.2 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:
1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, 4 AWG minimum.
1. Bury at least 35 inches (600 mm) below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Conductor Terminations and Connections:
   1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
   2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
   3. Connections to Ground Rods at Test Wells: Bolted connectors.
   4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

C. Poles Supporting Outdoor Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

D. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
   1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch grounding bus.

E. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

E. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet (6.0 m) long. If reinforcing is in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:
1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

D. Grounding system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:
1. Section 260548 "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:
1. Steel slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.

3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. Cooper B-Line, Inc.; a division of Cooper Industries.
   c. ERICO International Corporation.
   d. GS Metals Corp.
   e. Thomas & Betts Corporation.
   f. Unistrut; Tyco International, Ltd.
   g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
   1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1) Hilti Inc.
   2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
   3) MKT Fastening, LLC.
   4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. to compliance with requirements, provide products by one of the following:
      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slottedsupport system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts; Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69; Spring-tension clamps.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.
   1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor bolts to elevations required for proper attachment to supported equipment.
   3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
   1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Metal conduits, tubing, and fittings.
2. Boxes, enclosures, and cabinets.
3. Handholes and boxes for exterior underground cabling.

B. Related Requirements:
1. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.
2. Section 280528 "Pathways for Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.3 DEFINITIONS

A. ARC: Aluminum rigid conduit.

B. GRC: Galvanized rigid steel conduit.

C. IMC: Intermediate metal conduit.

1.4 SUBMITTALS

A. Submit in accordance with Sections 013310, Submital Procedures, and 013323, Shop Drawings, Product Data and Samples.

B. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

C. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
1. For handholes and boxes for underground wiring, including the following:
a. Duct entry provisions, including locations and duct sizes.
b. Frame and cover design.
c. Grounding details.
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
e. Joint details.

D. Coordination Drawings in AutoCAD: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members in the paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

E. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Source quality-control test reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. EMT: Comply with ANSI C80.3 and UL 797.

E. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
2. Fittings for EMT:
a. Material: Steel or die cast.
b. Type: Setscrew or compression.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

G. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. LFNC: Comply with UL 1660

E. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: Comply with UL 514B.

G. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.

2.4 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper B-Line, Inc.
2. Hoffman; a Pentair company.
3. Square D; a brand of Schneider Electric.

B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Technologies Company; Cooper Crouse-Hinds.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman; a Pentair company.
5. Hubbell Incorporated; Killark Division.
6. O-Z/Gedney; a brand of EGS Electrical Group.
7. RACO; a Hubbell Company.
8. Robroy Industries.
9. Spring City Electrical Manufacturing Company.
10. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.
11. Thomas & Betts Corporation.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.

E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep) and 4 inches by 2-1/8 inches by 2-1/8 inches deep (100 mm by 60 mm by 60 mm deep).

J. Gangable boxes are prohibited.

K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 or Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   2. Nonmetallic Enclosures: Plastic or Fiberglass.
   3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

L. Cabinets:
   1. NEMA 250, Type 1 or Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
   2. Hinged door in front cover with flush latch and concealed hinge.
   3. Key latch to match panelboards.
   4. Metal barriers to separate wiring of different systems and voltage.
   5. Accessory feet where required for freestanding equipment.

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:
   1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
   2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
   1. Manufacturers: Subject to compliance with requirements, provide products by the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Armorcast Products Company.
      b. Carson Industries LLC.
      c. CDR Systems Corporation; Hubbell Power Systems.
      d. NewBasis.

   2. Standard: Comply with SCTE 77.
   3. Configuration: Designed for flush burial with closed bottom unless otherwise indicated.
   4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
   5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
   6. Cover Legend: Molded lettering, "ELECTRIC"
   7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

8. Handholes 12 Inches Wide by 24 Inches Long (300 mm Wide by 600 mm Long) and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.7 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: GRC.
3. Underground Conduit: RNC. Type EPC-40-PVC:
a. Concrete-encased where indicated.
b. Provide wrapped rigid steel conduit for the following conditions:
1) Penetrations through foundation walls.
2) Bends greater than 22 degrees.
c. Stub ups, or where underground conduits otherwise become exposed.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
a. Loading dock.
b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
c. Mechanical rooms.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Raceways for Optical Fiber or Communications Cable for General Purpose Installation and in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
8. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.
   1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
   2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
   3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
   4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

H. Do not install conduits embedded in elevated slabs.

I. Support conduit within 12 inches (300 mm)of enclosures to which attached.

J. Raceways Embedded in Slabs:
   1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m)intervals.
   2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
   3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
   4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
   5. Change to GRC before rising above floor.

K. Stub-ups to Above Recessed Ceilings:
   1. Use EMT, IMC, or RMC for raceways.
   2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

M. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.

N. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

O. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

P. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

Q. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

R. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

S. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

T. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
   1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
   2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
   3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

U. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
   1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   2. Where an underground service raceway enters a building or structure.
   3. Where otherwise required by NFPA 70.

V. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

W. Expansion-Joint Fittings:
   1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
   2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
      a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
      b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
      c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
      d. Attics: 135 deg F (75 deg C) temperature change.
   3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
   4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
   5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

X. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit forequipment subject to vibration, noise transmission, or movement; and for transformers and motors.
   1. Use LFMC in damp or wet locations subject to severe physical damage.
   2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

AA. Locate boxes so that cover or plate will not span different building finishes.

BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

DD. Set metal floor boxes level and flush with finished floor surface.

EE. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:
   1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
   2. Install backfill as specified in Section 312000 "Earth Moving."
   3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
   4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
      a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete for a minimum of 12 inches (300 mm) on each side of the coupling.
      b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
   5. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."
      a. During backfilling of trenches install continuous underground-line warning tape with detectable metal strip directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

D. Install handholes with bottom below frost line, below grade.

E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.
   1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section expansion of existing cabling systems and includes:
   1. Pathways.
   2. UTP cabling.
   3. 50/125 or 62.5/125-micrometer, optical fiber cabling.
   4. Cable connecting hardware, patch panels, and cross-connects.
   5. Telecommunications outlet/connectors.
   6. Cabling system identification products.
   7. Cable management system.

B. Related Sections:
   1. Division 27 Section "Communications Backbone Cabling" for voice and data cabling associated with system panels and devices.
   2. Division 28 Section "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with system panels and devices.

1.3 DEFINITIONS

A. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.

B. BICSI: Building Industry Consulting Service International.

C. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel.

D. Consolidation Point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.

E. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

F. EMI: Electromagnetic interference.

G. IDC: Insulation displacement connector.

H. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).

I. LAN: Local area network.

J. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications outlet/connectors.

K. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.

L. RCDD: Registered Communications Distribution Designer.

M. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of longitudinal side rails and a bottom without ventilation openings.

N. Trough or Ventilated Cable Tray: A fabricated structure consisting of longitudinal side rails and a bottom having openings for the passage of air.

O. UTP: Unshielded twisted pair.

1.4 HORIZONTAL CABLING DESCRIPTION

A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called "permanent link," a term that is used in the testing protocols.
1. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
2. Horizontal cabling shall contain no more that one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
3. Bridged taps and splices shall not be installed in the horizontal cabling.
4. Splitters shall not be installed as part of the optical fiber cabling.

B. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the telecommunications outlet/connectors to the station equipment.

C. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment. The maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) in the horizontal cross-connect.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.
1. For coaxial cable, include the following installation data for each type used:
a. Nominal OD.
b. Minimum bending radius.
c. Maximum pulling tension.

B. Shop Drawings:
1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
3. Cabling administration drawings and printouts.
4. Wiring diagrams to show typical wiring schematics, including the following:
a. Cross-connects.

b. Patch panels.
c. Patch cords.

5. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
6. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:
   a. Vertical and horizontal offsets and transitions.
   b. Clearances for access above and to side of cable trays.
   c. Vertical elevation of cable trays above the floor or bottom of ceiling structure.
   d. Load calculations to show dead and live loads as not exceeding manufacturer's rating for tray and its support elements.

C. Qualification Data: For installer, qualified layout technician, installation supervisor, and field inspector.

D. Source quality-control reports.

E. Field quality-control reports.

F. Maintenance Data: For splices and connectors to include in maintenance manuals.

G. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings by an registered technician.
2. Installation Supervision: Installation shall be under the direct supervision of Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

B. Testing Agency Qualifications: An NRTL.
1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

C. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: **25** or less.
2. Smoke-Developed Index: **50** or less.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

F. Grounding: Comply with ANSI-J-STD-607-A.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.
   1. Test each pair of UTP cable for open and short circuits.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.10 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

1.11 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning with Substantial Completion, provide software support for two years.

B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
   1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.12 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Patch-Panel Units: One of each type.
   2. Connecting Blocks: One of each type.
   3. Device Plates: One of each type.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A.

B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
   1. Support brackets with cable tie slots for fastening cable ties to brackets.
   2. Lacing bars, spools, J-hooks, and D-rings.
   3. Straps and other devices.

C. Cable Trays:

1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Cable Management Solutions, Inc.
   b. Cablofil Inc.
   c. Cooper B-Line, Inc.
   d. Cope - Tyco/Allied Tube & Conduit.
   e. GS Metals Corp.

2. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick.

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   a. Ladder Cable Trays: Nominally 12 inches wide, and a rung spacing of 6 inches.

D. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."
   1. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

2.2 BACKBOARDS

A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements in Division 06 Section "Rough Carpentry" for plywood backing panels.

2.3 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. SYSTIMAX Solutions; a CommScope, Inc. brand, to match existing campus standards (or preapproved equivalent).

B. Description: 100-ohm, 4-pair UTP, formed into 25-pair, binder groups covered with a blue thermoplastic jacket.
   1. Comply with ICEA S-90-661 for mechanical properties.
   2. Comply with TIA/EIA-568-B.1 for performance specifications.
   3. Comply with TIA/EIA-568-B.2, Category 5e.
   4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
      a. Communications, General Purpose: Type CM or CMG.
      b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
      c. Communications, Riser Rated: Type CMR, complying with UL 1666.
      d. Communications, Limited Purpose: Type CMX.
      e. Multipurpose: Type MP or MPG.
      f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
      g. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

2.4 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. SYSTIMAX Solutions; a CommScope, Inc. brand, to match existing campus standards (or preapproved equivalent).

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Connecting Blocks: 110-style IDC for Category 5e Provide blocks for the number of cables terminated on the block, plus **25** percent spare. Integral with connector bodies, including plugs and jacks where indicated.

D. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
1. Number of Terminals per Field: One for each conductor in assigned cables.

E. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables with Power over Ethernet (POE) included.
1. Number of Jacks per Field: One for each four-pair UTP cable indicated.

F. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

G. Patch Cords: Factory-made, four-pair cables in **48-inch (1200-mm)** lengths; terminated with eight-position modular plug at each end.
1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
2. Patch cords shall have color-coded boots for circuit identification.

2.5 TELECOMMUNICATIONS OUTLET/CONNECTORS

A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.

B. Workstation Outlets: Two-port-connector assemblies mounted in single gang faceplate.
1. Plastic Faceplate: High-impact plastic. Coordinate color with Division 26 Section "Wiring Devices."
2. For use with snap-in jacks accommodating any combination of UTP, optical fiber, and coaxial work area cords.
   a. Flush mounting jacks, positioning the cord at a 45-degree angle.
3. Legend: Factory labeled by silk-screening or engraving for faceplates.
4. Legend: Machine printed, in the field, using adhesive-tape label.
5. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

2.6 OPTICAL FIBER CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Belden Inc.
2. Berk-Tek; a Nexans company.
3. CommScope, Inc.
4. Corning Cable Systems.
5. CSI Technologies Inc.
6. General Cable Technologies Corporation.

7. Mohawk; a division of Belden Networking, Inc.
8. Superior Essex Inc.
9. SYSTIMAX Solutions; a CommScope, Inc. brand.

B. Description: Multimode, 50/125 or 62.5/125-micrometer, 2-fiber, tight buffer, optical fiber cable.

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Comply with TIA-492AAAB orTIA-492AAAA-A for detailed specifications.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

   a. General Purpose, Nonconductive: Type OFN or OFNG.
   b. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
   c. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.
   d. General Purpose, Conductive: Type OFC or OFCG.
   e. Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.
   f. Riser Rated, Conductive: Type OFCR, complying with UL 1666.

5. Conductive cable shall be steel or aluminum armored type.
6. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
7. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

C. Jacket:

1. Jacket Color: Aqua for 50/125-micrometer cable or Orange for 62.5/125-micrometer cable.
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-C.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

2.7 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ADC.
2. American Technology Systems Industries, Inc.
3. Belden Inc.
4. Berk-Tek; a Nexans company.
5. Corning Cable Systems.
6. CSI Technologies Inc.
7. Dynacom Inc.
8. Hubbell Premise Wiring.
9. Molex Premise Networks; a division of Molex, Inc.
10. Siemon Co. (The).

B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

C. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.

D. Cable Connecting Hardware:

1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604-2-B, TIA-604-3-B, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
2. Quick-connect, simplex and duplex, Type SC orType ST connectors. Insertion loss not more than 0.75 dB.
3. Type SFF connectors may be used in termination racks, panels, and equipment packages.

2.8 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Comply with ANSI-J-STD-607-A.

2.9 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

2.10 CABLE MANAGEMENT SYSTEM

A. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

B. Basis-of-Design Product: Subject to compliance with requirements, provide cable management products, or comparable product by one of the following:
1. iTRACS Corporation.
2. Telsoft Solutions.

C. Description: Computer-based cable management system, with integrated database capabilities.

D. Document physical characteristics by recording the network, TIA/EIA details, and connections between equipment and cable.

E. Information shall be presented in database view, schematic plans, or technical drawings.
1. AutoCAD drawing software shall be used as drawing and schematic plans software.

F. System shall interface with the following testing and recording devices:
1. Direct upload tests from circuit testing instrument into the personal computer.
2. Direct download circuit labeling into labeling printer.

2.11 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.

E. Factory-sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

F. Cable will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
   1. Install plenum cable in environmental air spaces, including plenum ceilings.
   2. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.

B. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.

C. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

D. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

E. Install manufactured conduit sweeps and long-radius elbows whenever possible.

F. Pathway Installation in Communications Equipment Rooms:
   1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
   2. Install cable trays to route cables if conduits cannot be located in these positions.
   3. Secure conduits to backboard when entering room from overhead.

4. Extend conduits **3 inches (76 mm)** above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

G. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.4 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:
1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. MUTOA shall not be used as a cross-connect point.
5. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:
   a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
   b. Locate consolidation points for UTP at least 49 feet (15 m) from communications equipment room.
6. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
8. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
12. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
13. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:
1. Comply with TIA/EIA-568-B.2.
2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
3. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

D. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than [**60 inches (1524 mm)**] apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Installation of Cable Routed Exposed under Raised Floors:
1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable [**6 feet (1800 mm)**] <**Insert size**> long not less than [**12 inches (300 mm)**] <**Insert size**> in diameter below each feed point.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:
1. Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.5 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Penetration Firestopping."

B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.6 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar

with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.7 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
   1. Administration Class: 3.
   2. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.

B. Using cable management system software specified in Part 2, develop Cabling Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable and label cable, jacks, connectors, and terminals to which it connects with same designation. At completion, cable and asset management software shall reflect as-built conditions.

C. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.

D. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 level of administration.

E. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

F. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.

G. Cable and Wire Identification:
   1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
   2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
   3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
   4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
      a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
      b. Label each unit and field within distribution racks and frames.
   5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware.

Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

6. Uniquely identify and label work area cables extending from the MUTOA to the work area. These cables may not exceed the length stated on the MUTOA label.

H. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:
1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
2. Visually confirm Category 5e**,** marking of outlets, cover plates, outlet/connectors, and patch panels.
3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
5. Optical Fiber Cable Tests:
   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
   b. Link End-to-End Attenuation Tests:
      1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
      2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
6. UTP Performance Tests:
   a. Test for each outlet and MUTOA. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:
      1) Wire map.
      2) Length (physical vs. electrical, and length requirements).
      3) Insertion loss.
      4) Near-end crosstalk (NEXT) loss.
      5) Power sum near-end crosstalk (PSNEXT) loss.
      6) Equal-level far-end crosstalk (ELFEXT).
      7) Power sum equal-level far-end crosstalk (PSELFEXT).
      8) Return loss.

9) Propagation delay.
10) Delay skew.

7. Final Verification Tests: Perform verification tests for UTP systems after the complete communications cabling and workstation outlet/connectors are installed.
   a. Voice Tests: These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.
   b. Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

D. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets. Include training in cabling administration software.

END OF SECTION 271500

SECTION 280500 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Electronic safety and security equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electronic safety and security installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electronic safety and security equipment:
1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electronic safety and security items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.
1. Minimum Metal Thickness:
   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work.
2. Sealing Elements: Interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electronic safety and security equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS

A. Electronic safety and security penetrations occur when raceways, pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors **2 inches (50 mm)** above finished floor level.

G. Size pipe sleeves to provide **1/4-inch (6.4-mm)** annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint..

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electronic safety and security installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 280500

SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. UTP cabling.
2. Coaxial cabling.
3. RS-232 cabling.
4. RS-485 cabling.
5. Low-voltage control cabling.
6. Control-circuit conductors.
7. Identification products.

1.3 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. EMI: Electromagnetic interference.

C. IDC: Insulation displacement connector.

D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

E. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).

F. RCDD: Registered Communications Distribution Designer.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Pathways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.
1. For coaxial cable, include the following installation data for each type used:
a. Nominal OD.
b. Minimum bending radius.
c. Maximum pulling tension.

B. Shop Drawings: Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:
1. Vertical and horizontal offsets and transitions.

2. Clearances for access above and to side of cable trays.
3. Vertical elevation of cable trays above the floor or bottom of ceiling structure.

C. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

D. Seismic Qualification Certificates: For pathways, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Source quality-control reports.

F. Field quality-control reports.

G. Operation and Maintenance Data: For wire and cable to include in operation and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Allowable pulling tension of cable.
2. Cable connectors and terminations recommended by the manufacturer.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An NRTL.
1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.
1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical-fiber flashlight or optical loss test set.
2. Test optical fiber cable on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; include the loss value of each. Retain test data and include the record in maintenance data.
3. Test each pair of UTP cable for open and short circuits.

1.8 PROJECT CONDITIONS

A. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.
1. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.

B. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. Support of Open Cabling: NRTL labeled for support of Category 5e cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. Lacing bars, spools, J-hooks, and D-rings.
3. Straps and other devices.

B. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."

C. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

2.2 BACKBOARDS

A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels in Division 06 Section "Rough Carpentry".

2.3 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. ADC.
2. AMP Netconnect; a brand of Tyco Electronics Corporation.
3. Belden CDT Networking Division/NORDX.
4. Belden Inc.
5. Berk-Tek; a Nexans company.
6. CommScope, Inc.
7. Draka Cableteq USA.
8. Genesis Cable Products; Honeywell International, Inc.
9. Mohawk; a division of Belden.
10. Superior Essex Inc.
11. SYSTIMAX Solutions; a CommScope, Inc. brand.
12. 3M; Communication Markets Division.

B. Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket.
1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 5e.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
a. Communications, General Purpose: Type CM or CMG.
b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
c. Communications, Riser Rated: Type CMR, complying with UL 1666.
d. Communications, Limited Purpose: Type CMX.

e. Multipurpose: Type MP or MPG.
f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
g. Multipurpose, Riser Rated: Type MPR or MPP, complying with UL 1666.

2.4 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. ADC.
2. American Technology Systems Industries, Inc.
3. AMP Netconnect; a brand of Tyco Electronics Corporation.
4. Belden CDT Networking Division/NORDX.
5. Dynacom Corporation.
6. Hubbell Incorporated; Hubbell Premise Wiring.
7. Leviton Voice & Data Division.
8. Molex Premise Networks; a division of Molex, Inc.
9. PANDUIT CORP.
10. Siemon.

B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.

C. Connecting Blocks: 110-style for Category 5e. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

2.5 OPTICAL FIBER CABLE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. AMP Netconnect; a brand of Tyco Electronics Corporation.
2. Belden CDT Networking Division/NORDX.
3. Berk-Tek; a Nexans company.
4. CommScope, Inc.
5. Corning Incorporated; Corning Cable Systems.
6. CSI Technologies Inc.
7. General Cable Technologies Corporation.
8. Mohawk; a division of Belden.
9. Superior Essex Inc.
10. SYSTIMAX Solutions; a CommScope, Inc. brand.
11. 3M; Communication Markets Division.

B. Description: Multimode, 50/125 or 62.5/125-micrometer, 2-fiber, nonconductive, tight buffer, optical fiber cable.
1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Comply with TIA-492AAAB for detailed specifications.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
a. General Purpose, Nonconductive: Type OFN or OFNG, or OFNR, OFNP.
b. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
c. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.
d. General Purpose, Conductive: Type OFC or OFCG.
e. Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.

f. Riser Rated, Conductive: Type OFCR, complying with UL 1666.
5. Conductive cable shall be steel or aluminum armored type.
6. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
7. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

C. Jacket:
1. Jacket Color: Aqua for 50/125-micrometer cable, or Orange for 62.5/125-micrometer cable.
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-C.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

2.6 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. ADC.
2. American Technology Systems Industries, Inc.
3. Belden CDT Networking Division/NORDX.
4. Berk-Tek; a Nexans company.
5. Corning Incorporated; Corning Cable Systems.
6. CSI Technologies Inc.
7. Dynacom Corporation.
8. Hubbell Incorporated; Hubbell Premise Wiring.
9. Molex Premise Networks; a division of Molex, Inc.
10. Siemon.

B. Cable Connecting Hardware: Meet the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604-2-B, TIA-604-3-B, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
1. Quick-connect, simplex and duplex, Type SC connectors. Insertion loss not more than 0.75 dB.
2. Type SFF connectors may be used in termination racks, panels, and equipment packages.

2.7 COAXIAL CABLE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Alpha Wire Company.
2. Belden CDT Networking Division/NORDX.
3. Coleman Cable, Inc.
4. CommScope, Inc.
5. Draka Cableteq USA.

B. General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.

C. RG59/U: NFPA 70, Type CATVR.
1. No. AWG, solid, silver-plated, copper-covered steel conductor.
2. Gas-injected, foam-PE insulation.
3. Triple shielded with 100 percent aluminum polyester tape and 95 percent aluminum braid; covered by aluminum foil with grounding strip.

4. Color-coded PVC jacket.

D. RG-6/U: NFPA 70, Type CATV or CM.
1. No. AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
2. Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
3. Jacketed with black PVC or PE.
4. Suitable for indoor installations.

E. RG59/U: NFPA 70, Type CATV.
1. No. 20 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
2. Double shielded with 100 percent aluminum polyester tape and 40 percent aluminum braid.
3. PVC jacket.

F. RG59/U (Plenum Rated): NFPA 70, Type CMP.
1. No. 20 AWG, solid, copper-covered steel conductor; foam fluorinated ethylene propylene insulation.
2. Double shielded with 100 percent aluminum-foil shield and 65 percent aluminum braid.
3. Copolymer jacket.

G. NFPA and UL Compliance: Coaxial cables shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655, and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:
1. CATV Cable: Type CATV, or CATVP or CATVR.
2. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
3. CATV Riser Rated: Type CATVR, or CATVP, CATVR, or CATV, complying with UL 1666.
4. CATV Limited Rating: Type CATVX.

2.8 COAXIAL CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Emerson Network Power Connectivity Solutions; AIM Electronics brand.
2. Leviton Voice & Data Division.
3. Siemon.

B. Coaxial-Cable Connectors: Type BNC, 75 ohms.

2.9 RS-232 CABLE

A. Standard Cable: NFPA 70, Type CM.
1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Polypropylene insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. PVC jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated Cable: NFPA 70, Type CMP.
1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Plastic insulation.

3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

2.10 RS-485 CABLE

A. Standard Cable: NFPA 70, Type CM or CMG.
1. Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated Cable: NFPA 70, Type CMP.
1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Fluorinated ethylene propylene jacket.
5. Flame Resistance: NFPA 262, Flame Test.

2.11 LOW-VOLTAGE CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.
1. 1 pair, twisted, No. 16 AWG, stranded (19x29) and No. 18 AWG, stranded (19x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
1. 1 pair, twisted, No. 16 AWG, stranded (19x29) and No. 18 AWG, stranded (19x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

2.12 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway] [Type XHHN, complying with UL 44, in raceway.

B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway, power-limited cable, complying with UL 83, concealed in building finishes, Type XHHN, complying with UL 44, in raceway.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

2.13 FIRE ALARM WIRE AND CABLE

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Comtran Corporation.
2. Draka Cableteq USA.
3. Genesis Cable Products; Honeywell International, Inc.
4. Rockbestos-Suprenant Cable Corp.
5. West Penn Wire; a brand of Belden Inc.

B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.

C. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.
1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.

D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.
3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NTRL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

2.14 IDENTIFICATION PRODUCTS

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Brady Corporation.
2. HellermannTyton.
3. Kroy LLC.
4. PANDUIT CORP.

B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

C. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

2.15 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Factory test multimode optical fiber cables according to TIA-526-14-A and TIA/EIA-568-B.3.

E. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

F. Cable will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA-569-B.

B. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.

C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems." for installation of conduits and wireways.

D. Install manufactured conduit sweeps and long-radius elbows whenever possible.

E. Pathway Installation in Equipment Rooms:
1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard when entering room from overhead.
4. Extend conduits **3 inches (75 mm)** above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements in Division 26 Section "Hangers and Supports for Electrical Systems." for installation of supports for pathways, conductors and cables.

3.3 WIRING METHOD

A. Install wiring in metal raceways and wireways. Conceal raceway except in unfinished spaces and as indicated. Minimum conduit size shall be **3/4 inch (21 mm)**. Control and data transmission wiring shall not share conduit with other building wiring systems.

B. Install wiring in raceways except in accessible indoor ceiling spaces and in interior hollow gypsum board partitions where cable may be used. Conceal raceways and wiring except in unfinished spaces and as indicated. Minimum conduit size shall be [**3/4 inch (21 mm)**. Control and data transmission wiring shall not share conduit with other building wiring systems.

C. Install cable, concealed in accessible ceilings, walls, and floors when possible.

D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as

recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

3.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.

C. General Requirements for Cabling:
1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

D. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 5e rating of components and that ensure Category 5e performance of completed and linked signal paths, end to end.
1. Comply with TIA/EIA-568-B.2.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

E. Optical Fiber Cable Installation:
1. Comply with TIA/EIA-568-B.3.
2. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.

F. Outdoor Coaxial Cable Installation:
1. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
2. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).

G. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than **60 inches (1525 mm)** apart.

3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

H. Installation of Cable Routed Exposed under Raised Floors:
1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable **72 inches (1830 mm)** long shall be neatly coiled not less than **12 inches (300 mm)** in diameter below each feed point.

I. Separation from EMI Sources:
1. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.5 FIRE ALARM WIRING INSTALLATION

A. Comply with NECA 1 and NFPA 72.

B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceway and Boxes for Electrical Systems."
1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:
1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is[**not**] permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables [**may**] [**shall not**] be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

H. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.6 POWER AND CONTROL-CIRCUIT CONDUCTORS

A. 120-V Power Wiring: Install according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.

B. Minimum Conductor Sizes:
1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

3.7 CONNECTIONS

A. Comply with requirements in Division 28 Section "Perimeter Security Systems" for connecting, terminating, and identifying wires and cables.

B. Comply with requirements in Division 28 Section "Intrusion Detection" for connecting, terminating, and identifying wires and cables.

C. Comply with requirements in Division 28 Section "Access Control" for connecting, terminating, and identifying wires and cables.

D. Comply with requirements in Division 28 Section "Video Surveillance" for connecting, terminating, and identifying wires and cables.

E. Comply with requirements in Division 28 Section "PLC Electronic Detention Monitoring and Control Systems" for connecting, terminating, and identifying wires and cables.

F. Comply with requirements in Division 28 Section "Digital Addressable Fire-Alarm System" for connecting, terminating, and identifying wires and cables.

G. Comply with requirements in Division 28 Section "Refrigerant Detection and Alarm" for connecting, terminating, and identifying wires and cables.

3.8 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Penetration Firestopping."

B. Comply with TIA-569-B, "Firestopping" Annex A.

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.9 GROUNDING

A. For communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. For low-voltage wiring and cabling, comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

3.10 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:
1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.
    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
4. Optical Fiber Cable Tests:
    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:
        1) Multimode Link Measurements: Test at 850 or 1300 nm in 1 direction according to TIA-526-14-A, Method B, One Reference Jumper.

2) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

5. Coaxial Cable Tests: Comply with requirements in Division 27 Section "Master Antenna Television System."

D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 280513

SECTION 281300 - CARD ACCESS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes expansion of and additions to existing, access control and security systems and specifies access control panels, sensors, signal equipment, and system controls.

B. Delayed exit hardware is being added at various building exits. The work of this section shall provide cabling to these doors as indicated in the drawings and provide alarm contact information back to the access control security system. The security contractor will also be required to provide power supplies and cabling for the door hardware from the telecom rooms.

1.3 DEFINITIONS

A. Hard-Wired System: Alarm, supervisory, and detection devices are directly connected, through individual dedicated conductors, to distributed control panels.

1.4 SYSTEM DESCRIPTION

A. The system shall be a modular access control, and alarm monitoring network that allows for easy expansion or modification of inputs, outputs, and remote control stations. The system control at the central computer location shall be under a single software program control, and shall provide full integration of all components, which shall be alterable at any time, depending upon the facility requirements. System Software shall use Windows NT operating system with open database architecture and full 32-bit ODBC support. Reconfiguration of the system shall be accomplished on-line through system programming, without hardware changes.

B. The system shall support both manual responses such as panic (duress) switches, and automatic responses such as door contact switches and alarms entering the system. Each alarm condition shall be capable of initiating numerous events including but not limited to: Activation of remote devices, door control, remote annunciation LED’s, and card validation.

C. Access control functions shall include but not be limited to: Validation based on time of day and day of week, holiday scheduling with card validation override, and access validation based on positive verification of card.

D. Utilizing assigned passwords, it shall be possible to define the levels of system operation for each individual operator. Operator action's range from basic monitoring to full control of the system including programming.

E. The system programming shall be user friendly, and capable of being accomplished by personnel with no prior computer experience. The programming shall be MENU driven and include on-line 'Help' or 'Tutorial' information, as well as on-line data entry examples. The system shall provide both supervised and non-supervised alarm point monitoring. The system shall be capable of arming or disarming alarm points both manually and automatically, by time of day, and day of week.

F. The system shall interface with the fire alarm system and in the event of an alarm, shall release all controlled doors and put them in Aaccess@ or as indicated.

G. The system shall interface with a Motorola paging system to alert on site staff of alarms.

1.5 FUNCTIONAL PERFORMANCE

A. The system shall consist of intelligent controllers used in a distributed processing configuration. Each controller shall retain all data necessary for system operation in it's own RAM. Each controller will contain an integrated real time clock that continues to govern events even if communication with the host computer is interrupted.

B. The system host computer shall act as an interface point with the controller network, a data base management tool, and a transaction storage device. Upon the successful entry of passwords, the host computer shall be accessible via the owners computer network utilizing LAN network software and hardware.

C. Card access system basic requirements:
1. Provide a system including but not limited to the following capabilities:
a. ADD, DELETE, REPORT or EDIT cardholder information.
b. Cardholder information shall include unique card number up to 12 digits and optional Personal Identification Number
c. Provide 16 user fields, 5 searching.
d. Provide storage of all system transactions in a retrievable history file.
e. Provide ability to program descriptions for all system alarm points.
f. Provide ability to program description for all system output relays.
g. Provide ability to program description for all system card readers.
h. Video monitoring.
i. Monitor both supervised and non-supervised alarm points.
j. Report alarm point activity or status.
k. The reporting shall notify system of 'Alarm,' 'Normal,' or 'Trouble' condition.
l. Display Floor-plan graphic for any alarm point. (Not used)
m. Display Floor-plan graphic for card activity. (Not used)
n. Interlock any alarm point condition to an output relay.
o. Interlock any alarm point condition to another alarm point.
p. Program alarms and associate incoming alarms with related outputs.
q. Bypass alarms in the system.
r. Log all events by time and date.
s. Allow select of logging transactions to more than one system printer.
t. Provide capability to store all or selected system transactions in a disk file (History files).
u. Provide reporting capability for printing of selected system transactions from the disk files by time or date selection.
v. Provide complete data base reporting of all data programmed into the system data files.
w. Execute alarm interrupts in all modes of operation.
x. Provide operator password control of all system functions.
y. Provide ability to make system configuration changes at any time.
z. Provide mode of system operation that requires operator access level which defines area's of valid access and day of access.
aa. Provide special card options such as time zone reference which defines valid time including; limited uses that provide specific number of uses, visitor use which provides specific number of days.
bb. Allow 'trace' function; display all usage of a card.
cc. ADD, DELETE, REPORT or EDIT time zone definitions. Time zone definitions shall include; starting time, ending time, days of the week, holiday override and a provision to link multiple time zone definitions.

dd. ADD, DELETE, REPORT or EDIT access level definitions. The access Levels shall define specific points of access.
ee. ADD, DELETE, REPORT or EDIT action messages. The action messages may be displayed upon specific alarm activity or card usage.
ff. System shall support 'global anti-passback', allow cardholder to enter / exit any card reader.
gg. Provide the ability to create, edit, or delete unique floor-plan graphics.
hh. Provide the ability to acknowledge any alarm.
ii. Provide mode of system operation that requires operator acknowledgment of system commands.
jj. Provide mode of operation that does not require operator acknowledgment of alarms or system commands.
kk. Provide the ability to log operator transactions on the system printer as well as in the history files.
ll. Provide capability through software to initiate auto-dial modem command to establish communications with remote control panels via standard telephone circuits. (Not used)
mm. Allow disabling of alarm messages.
nn. Provide ability to associate an extended message for any alarm.
oo. Provide capability to place remote control panels in an off-line mode. In the off-line mode, the remote control panels shall retain a historical summary of all control panel transactions.
pp. Provide programmable 'delay' setting for all system alarm points. The system shall not report the alarm condition until the delay setting has expired.
qq. Video interface (Not used).
rr. Provide the ability in the dynamic alarm display to color code each specific alarm point action of: alarm, normal, trouble and time zone control. (Not used)
ss. Provide ability for manual operator control of system output relays. The manual functions shall include the ability to energize, de-energize, or pulse the output relay. The pulse time shall be a programmable setting.
tt. Support multiple card reader technology including:
    1) Wiegand effect.
    2) Magnetic strip.
    3) Proximity.
    4) Biometrics.
    5) Bar Code.
    6) Support use of keypad for access control
    7) Support use of card/keypad (PIN) for access control.

D. Time and attendance
    1. Provide specific shift definitions of:
        1) Normal shift time.
        2) Allowable break time.
        3) Over time definition.
        4) Normal work week / month.
    2. Provide report of 'Time-In,' 'Time-out' by cardholder, or by department or description.
    3. Provide report of hours calculated.

E. Parking lot management.

F. Event programming by time.
    1. Arm / disarm alarm points by time zone definition.
    2. Activate / deactivate output relays by time zone.
    3. Interface with other computer systems.
    4. Provide pick lists for all system required information that the user has previously entered.

1.6 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for system components, including "Nationally Recognized Testing Laboratory" (NRTL) listing data and list of materials, dimensioned plans, sections, and elevations showing minimum clearances, mounting arrangements, and installed features and devices.

C. Wiring diagrams for system, including all devices, components, and auxiliary equipment showing complete system wiring. System diagram is unique to the Project system; a manufacturer's generic system diagram is not acceptable. Diagrams differentiate between manufacturer-installed and field-installed wiring. Include diagrams for each piece of specific equipment and for system with all terminals and interconnections identified

D. System operation description, including method of operation and supervision of each component and each type of circuit, and sequence of operations for all manually and automatically initiated system inputs. Description must cover this specific Project; manufacturer's standard descriptions for generic systems are not acceptable.

E. Operation and maintenance data for inclusion in "Operating and Maintenance Manual" specified in Division 1. Include data for each type product, including all features and operating sequences, both automatic and manual. Include user's software data and recommendations for spare parts to be stocked at the site. Provide names, addresses, and telephone numbers of service organizations that stock repair parts for the system.

F. Product certifications signed by the manufacturers of system components certifying that their products comply with the referenced standards.

G. Separate Qualification Data for Manufacturers and Installers: Demonstrate their capabilities and experience as specified in Quality Assurance Article. Include lists of completed projects with project names and addresses, names of Engineers and Owners, plus other information specified.

H. Record of field tests of system.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firms with a minimum of 5 years experience in manufacturing equipment of the types and capacities indicated that have a record of successful in-service performance. The prime system manufacturer shall maintain a service center capable of providing training, parts, and emergency maintenance and repairs for the overall system.

B. Installer Qualifications: The installer shall be a factory authorized sales and services representative of the system submitted. At the time of bid, the bidder shall have a minimum of 5 years of experience installing systems of similar size, complexity, and general operation as the system described in this specification. When requested to do so, the installer shall furnish, in writing, proof of compliance with system manufacturers service and installation certification programs. Installer must be capable of providing emergency maintenance and repairs for the overall system at the project site with 24 hours maximum response time. The installer shall have a local office staffed with factory trained technicians, fully capable of supervising installation, system start-up, providing training and servicing of both hardware

and software for systems of similar complexity and function as the system described in this specification.

C. Comply with NFPA 70, "National Electrical Code."

D. Listing and Labeling: Provide system and components that are listed and labeled for their indicated use and location on the Project.
   1. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

E. Comply with UL Standard 609, 1023, and 1076.

F. FM Compliance: Provide FM-approved card access system and components.

G. Single-Source Responsibility: Obtain system components from a single source (the prime system manufacturer) that assumes responsibility for system components and for their compatibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, for new systems provide products by one of the following (match existing at Farmington and Layton):
   1. S2 (to match existing system, or preapproved equivalent) requires replacement of all existing system functions and interfaces).

2.2 ACCESS CONTROL SYSTEM EQUIPMENT, GENERAL

A. Surge Protection: Comply with minimum requirements of UL Standard 1449, "Transient Voltage Surge Suppressors," for each component using solid-state devices and having a line voltage power source connection or an exterior underground signal connection.

B. Provide at the locations identified, a completely operational Access Control and Security System including but not limited to the following equipment:
   1. Card Readers
   2. Access control panels
   3. Relay output contacts
   4. All power supplies or transformers
   5. All equipment, security devices, components, wire, cable, and mounting hardware as required to meet specification requirements and manufacturers documented installation procedures.

C. Basic Central System Components:
   1. Central Processing Unit and door controllers to meet the system functional specifications listed above and for the number of readers as indicated in the drawings.
   2. System Software (EXISTING): The access control system software shall serve as a database manager, controlling card/keycode data, access levels, timezone/holiday schedules and alarm point information and provide for a complete, fully integrated system. The software shall provide a means to download all database information to the individual control panels. The software shall be menu-driven, allowing straight-forward programming and operation. The software shall be user-oriented, with help screens, instructional prompts and English description displays. The software shall utilize pick list for all previously enter system required data. All system programming shall be performed at the computer keyboard.

a. Printer Output: The software shall support direct report printing.
b. Monitor Display: The software shall display all system activity on a color or monochrome monitor, in real time. The software shall cause an audible tone upon all alarm conditions. The software shall provide an optional manual keyboard acknowledge function for all incoming alarm messages.
c. Disk Storage: The software shall store user-selected activity on the hard disk. Report options shall recall selected history information from the hard disk. The user may request report information based on selected cardholders, specific areas and/or specific times. A unique history file shall be created each day, allowing backup of selected files to floppy disk.
d. Databases: The software shall create independent databases for selected groups of information (cards, timezones, etc.), allowing backup of selected files to floppy disk. The software shall provide edit, add, delete, find and print options for records in selected databases.
e. English Descriptions: The software shall support descriptive names for all database entries. The card database shall include name, number, department, description and six note fields and or nine user defined fields.
f. Password Protection: The software shall provide password protection, with user-defined operator name/password combinations. Name/password log-on shall restrict operators to selected areas of the program.
g. Action Messages: The software shall allow recall of user-created text messages upon alarm condition.
h. Manual Panel Control: The software shall allow manual control of selected input and output points. Manual panel control shall include pulse and energize/de-energize options for output points and shunt/unshunt options for input points.
i. Terminal Mode: The software shall provide a terminal mode of operation, to allow direct communication from the computer to the control panels, for trouble-shooting capability.

2.3 HOST PC REQUIREMENTS (EXISITNG)

A. The system software must operate on an "off the shelf" IBM compatible PC. This PC must have Intel or equivalent mother board and an industry standard BIOS. Any PC with a proprietary BIOS, DOS, or other software is not acceptable.

2.4 ELECTRICAL POWER

A. Normal System Power Supply: 120 V 60 Hz from locked disconnect device. System components are supplied with power through the system control panel.

B. Power Source Transfer: When normal power is interrupted, system is automatically switched to backup supply without degradation of critical system function or loss of signals or status data.

C. Backup Source: Batteries in power supplies of individual system components. Such batteries are an integral part of power supplies of the components.

D. Annunciation: Switching of the system or any system component to backup power is indicated as a change in system condition.

2.5 CARD ACCESS SYSTEM HARDWARE, GENERAL

A. Types, features, accessories, and mounting conditions of individual devices are as indicated.

B. Input Points: An access control panel supporting card readers shall provide a minimum of 8 input points.

C. Output Points: The access control panel shall provide a minimum of two double-pole, double-throw (DPDT) form C relays, rated for 12 VDC at 3 amps. Provide additional output points if necessary as indicated for this project.

D. Battery Back-up: The access control panel shall provide an 8 VDC back-up battery for up to three hour operation upon loss of AC power. The access control panel shall provide a 3 VDC lithium battery to retain database information for up to 30 days upon loss of power.

E. Suppression: The access control panel shall have provisions for relay suppressor kits for each relay used, to protect the access control panel from collapsing electrical fields.

F. Card Readers/Keypads: The access control panel shall support card readers using Magstripe, Barcode, Wiegand, Proximity and Biometrics technologies. The access control panel shall support a 12-button numeric keypad. Card readers with a keypad as indicated.
   1. Proximity Readers: Provide proximity readers that are compatible with existing access cards only. The reader shall be powered by an external +12VDC regulated power supply. The card shall use 26 bits and have a label indicating the encoded number. The reader shall meet the following specifications:
      a. Electrical: Voltage +12 VDC nominal voltage (10.5-14 volts), 130 mA.
      b. Environmental: Outdoor operating temperature -30 to +65 degrees. Indoor operating temperature 0 to +50 degrees.

G. Cards: Use existing access cards. The cards shall be capable of operating in temperatures from -50 degrees to 160 degrees F, and in relative humidity from 5% to 95%.

2.6 CARD ACCESS SYSTEM FIRMWARE, GENERAL

A. Card/Keycode Capacity: The access control panel shall store a minimum of 3000 cards/key codes, expandable to a minimum of 9000 with memory upgrade.

B. Buffer Capability: The access control panel shall support an optional buffered mode of operation. When operating in the buffered mode, the access control panel shall store all transactions in memory, rather than transmitting them through the communication loop. The access control panel shall transmit the buffered (stored) information upon request. The access control panel shall buffer a minimum of 1850 transactions, expandable to 5000 with a memory upgrade.

C. Format Commands: The access control panel shall store a minimum of five format (software) commands, allowing use of cards with various bit structures and encoding schemes.

D. Site Codes: The access control panel shall store up to three site codes for card use.

E. Use/Visitor Status Cards: The access control panel shall support the use of Limited Use and Visitor status cards. Limited Use cards shall be valid from 1-254 times, after which they will expire. Visitor cards shall be valid from 1-254 days, after which they will expire.

F. Cards (digits): The access control panel shall be capable of recognizing card numbers up to 12 digits as an option.

G. Anti-Passback: The access control panel shall support the use of an anti-passback mode, in which cardholders are required to follow a proper in/out sequence.

H. Global Anti-Passback: The access control panel in the system shall support the use of an anti-passback mode, in which cardholders are required to follow a proper in/out sequence on a per loop basis for system anti-passback.

I. Personal Identification Numbers (PINs): The access control panel shall support the use of card readers in conjunction with keypads, in which users are required to enter a PIN, followed by a card, to gain access.

J. Time Zones: The access control panel shall store up to 63 time zones.
1. Each time zone shall include a start time, end time, day of week specification and holiday specification.
2. Time zones may be assigned to cards to define when the cards allow access.
3. Time zones may be assigned to input points, to define when the input points are shunted (de-activated).
4. Time zones may be assigned to output points (relays), to define when the output points are energized, for timed control of doors or devices.

K. Input Points: The user shall have the ability to assign shunt times to input points, from 1-60 seconds, minutes, and hours.

L. Output Points: The user shall have the ability to assign pulse times to output points, from 1-60 seconds, minutes, and hours.

M. Interlocking: The user shall have the ability to interlock selected input and output points, in any combination. An interlocked input or output point shall take action based upon a change of state from another input or output point.

N. Group Control: The access control panel shall store a minimum of 32 relay group definitions. Each group may be controlled with the same options available for individual relays.

O. Holidays: The access control panel shall recognize up to 32 days as holidays, for override of normal system operation.

P. Enclosure: The control panel enclosure shall have hinge cover with key lock. A control panel input point shall monitor an enclosure tamper switch.

2.7 DURESS ALARM DEVICES, GENERAL

. Hard Wired Duress Switch – A switch with a shroud over the activating lever that allows an individual to covertly send a duress signal to access control unit and associated annunciators, with no visible or audible indication when activated. Switch shall lock in activated position until reset with a key.
1. Push Button: Finger activated, suitable for mounting on horizontal or vertical surfaces.

2.8 DOOR CONTACT INDICATORS

A. Contact indicators (or integral door position switch contacts) will be furnished with electrical door hardware for all card access doors and monitored doors. Provide installation and termination of furnished contact indicators as required.

2.9 POWER SUPPLIES.

A. Provide access control power supplies as per manufacturers written recommendations with total number of powered devices for each power supply restricted to only consuming 75 percent of the power supplies rated amperage. Provide separate power supplies for access controllers and for access locking devices. Coordinate with electronic lock provider.

2.10 WIRE AND CABLE

A. General: Stranded copper. Size conductors as required by system manufacturer.

B. Comply with Division 16 Section "Wires and Cables" except as indicated.

C. Cable for Low-Voltage Control and Signal Circuits: Unshielded, twisted-pair cable, except where manufacturer recommends shielded cable. Comply with Division 16 Section "Control/Signal Transmission Media."

D. Plenum cable: Provide plenum rated cable throughout.

2.11 RACEWAY

A. Comply with Division 16 Section "Raceways."

2.12 MISCELLANEOUS HARDWARE

A. General: System includes supports, mounting brackets, and installation hardware for components. Metal hardware is of corrosion-resistant material.

2.13 FINISHES

A. Color: Manufacturers standard of white, except:

2.14 TAMPERPROOF FASTENERS

A. Provide fasteners with Torx center rejection pin heads in high security areas.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install system according to NFPA 70, applicable codes, and manufacturer's printed instructions.

B. Wiring Method: Install wiring in raceways and cable trays. Conceal raceways except in unfinished indoor spaces. Conduit fill shall not exceed 40%.

C. Wiring Within Panels And Enclosures: Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars and distribution spools.

D. Number of Conductors: As recommended by system manufacturer for functions indicated.

E. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures.

F. Tighten connections to comply with tightening torques specified in UL Standard 486A.

G. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so media are identified and coordinated with system wiring diagrams.

H. Install power supplies and other auxiliary components for detection devices at the access control panel or at a data-gathering panel except as otherwise indicated. Do not install such items in the vicinity of the devices they serve.

I. Coordinate with lock and gate hardware providers for wiring to their respective equipment.

3.2 GROUNDING

A. Ground system components and conductor and cable shields to eliminate shock hazard and to minimize ground loops, common mode returns, noise pickup, cross talk, and other impairments.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and system pretesting, testing, adjustment, and programming.

B. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.

C. Pretesting: Align and adjust the system and perform pretesting of all components, wiring, and functions to verify conformance with specified requirements. Correct deficiencies by replacing malfunctioning or damaged items with new items. Retest until satisfactory performance and conditions are achieved.

D. Testing: Provide at least 10 days' notice of acceptance test performance schedule.

E. Operational Tests: Perform operational system tests to verify conformance with specifications. Test all modes of system operation and intrusion detection. Methodically test for false alarms in each zone of space intrusion detection devices by simulating activities outside indicated detection patterns.

F. Retesting: Correct deficiencies and retest until the total system meets the requirements of the Specifications and complies with applicable standards.

G. Test and Inspection Reports: Prepare test and inspection reports, submit to project engineer prior to acceptance test.

H. Installer Start-up Responsibility: The Installer shall initiate system operation. Competent start-up personnel shall be provided by the Installer on each consecutive working day until the system is fully functional. Upon reoccurring technical problems, the Installer shall supply factory direct Manufacturer's support in the form of factory technical representation and/or diagnostic equipment until the resolution of those defined problems.

3.4 ADJUSTMENT

A. Occupancy Adjustments: When requested within 1 year of date of substantial completion, provide on-site assistance in adjusting and reprogramming to suit actual occupied conditions. Provide up to 3 visits to the site per building for this purpose without additional cost.

3.5 DEMONSTRATION

A. Train Owner's operating personnel in the programming and operation of the system. Train Owner's maintenance personnel in the procedures and schedules involved in preventive maintenance and in programming, operating, adjusting, troubleshooting, and servicing of the system. Provide a minimum of 16 hours training.

B. Schedule training with advance notice of at least 7 days.

END OF SECTION 281300

SECTION 282300 - VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a video surveillance system upgrade consisting of new and existing analog cameras IP cameras, hybrid digital-video/network-video recorder, data transmission wiring, and a control station with its associated equipment.

B. Video surveillance system shall be integrated with monitoring and control system specified in Division 28 Sections "Access Control" and "Duress Alarms" which specifies systems integration.

1.3 DEFINITIONS

A. AGC: Automatic gain control.

B. BNC: Bayonet Neill-Concelman - type of connector.

C. B/W: Black and white.

D. CCD: Charge-coupled device.

E. FTP: File transfer protocol.

F. IP: Internet protocol.

G. LAN: Local area network.

H. MPEG: Moving picture experts group.

I. NTSC: National Television System Committee.

J. PC: Personal computer.

K. PTZ: Pan-tilt-zoom.

L. RAID: Redundant array of independent disks.

M. TCP: Transmission control protocol - connects hosts on the Internet.

N. UPS: Uninterruptible power supply.

O. WAN: Wide area network.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Video surveillance system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
3. Wiring Diagrams:
4. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
5. UPS: Sizing calculations.
6. Wiring Diagrams: For power, signal, and control wiring.

C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

D. Field quality-control reports.

E. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, monitors, videotape recorders, digital video recorders, video switches, and control-station components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

F. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NECA 1.

C. Comply with NFPA 70.

D. Comply with FCC - Class A, CE, and RoHS regulations.

E. Electronic data exchange between video surveillance system with an access-control system shall comply with SIA TVAC (when indicated).

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
1. Control Station: Rated for continuous operation in ambient temperatures of 60 to 85 deg F (16 to 29 deg C) and a relative humidity of 20 to 80 percent, noncondensing.
2. Interior, Controlled Environment: System components, except central-station control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg F (2 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
3. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of 0 to 122 deg F (minus 18 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 3R enclosures.
4. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph (137 km/h) and snow cover up to 24 inches (610 mm) thick. Use NEMA 250, Type 4X enclosures.
5. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. Analog video-signal format shall comply with NTSC standard, composite interlaced video. Composite video-signal termination shall be 75 ohms.

B. IP video-signal format shall comply with IEEE 802.3 Ethernet standard.

C. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.
1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Division 26 Section "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits."
2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Division 26 Section "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits." as recommended by manufacturer for type of line being protected.

D. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

E. Building Entry Protection:

2.2 ANALOG CAMERAS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Dynamics.
2. CNB Technology Inc.
3.

B. Color Camera:
1. Comply with UL 639.
2. Pickup Device: CCD interline transfer, 380,000 771(H) by 492(V) pixels.
3. Horizontal Resolution: 500 lines.
4. Signal-to-Noise Ratio: Not less than 50 dB, with camera AGC off.
5. With AGC, manually selectable on or off.
6. Sensitivity: Camera shall provide usable images in low-light conditions, delivering an image at a scene illumination of 0.2 lux at F2.0, with camera AGC off.
7. Sensitivity: Camera shall deliver 1-V peak-to-peak video signal at the minimum specified light level. Illumination for the test shall be with lamps rated at approximately 2200-K color temperature, and with camera AGC off.
8. Manually selectable modes for backlight compensation or normal lighting.
9. Scanning Synchronization: Determined by external synch over the coaxial cable. Camera shall revert to internally generated synchronization on loss of external synch signal.
10. White Balance: Auto-tracing white balance, with manually settable fixed balance option.
11. Motion Detector: Built-in digital.
12. Back-light compensation:
13. Auto-Iris:
14. Varifocal Lens:

C. Reinforced Dome Camera: Designed for detention and high-abuse locations, with a weathertight surface mounting, impact-resistance polycarbonate dome, and heavy-gage, 6061 T6 aluminum body.
1. Suitable for exterior environment, rated for continuous operation in ambient temperatures of minus 40 to plus 122 deg F (minus 40 to plus 50 deg C) dry bulb and up to 85 percent relative humidity.
2. Pickup Device: CCD interline transfer, 380,000 **768**(H) by 494(V) pixels.
3. Horizontal Resolution: 500 lines.
4. Signal-to-Noise Ratio: Not less than 46 dB.
5. With AGC and automatic backlight compensation.
6. Sensitivity: Camera shall provide usable images in low-light conditions, delivering an image at a scene illumination of 0.2 lux at f/2.0.
7. Scanning Synchronization: Determined by external synch over the coaxial cable. Camera shall revert to internally generated synchronization on loss of external synch signal.
8. White Balance: Auto-tracing white balance

2.3 IP CAMERAS

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following:
1. Arecont Technologies Inc.
2. Axis.
3.

B. Fixed IP Camera: The fixed IP camera is dual encoder (H.264 & MJPEG), 1.3 Megapixel resolution, IP addressable camera. It is designed to deliver full motion high definition progressive scan digital video across local area networks. The camera is PoE (IEEE 802.3af) compliant. The camera has the ability to output multiple image formats allowing the simultaneous viewing of the full resolution field of view and regions of interest for high definition forensic zooming. The fixed IP camera must meet the following operating requirements

1. Operational:
   a. Imaging 1.3 megapixel CMOS image sensor.
   b. 1/2" optical format.
   c. Bayer mosaic RGB filter
   d. Active Pixel Count: 1600(H) x 1200(V) pixel array per sensor. 6400(H) x 1200(V) pixels across all four sensors.
   e. Minimum Illumination Color: 0.2 Lux @ F2.0
   f. Dynamic range 61 dB
   g. Maximum SNR 50 dB
2. Full Field of View (FOV) Resolutions per Sensor:
   a. 1280(H) x 1624(V) at 1.3 megapixel.
   b. 640(H) x 512(V) at 1/4 resolution.
3. Cropped Field of View Resolutions per Sensor:
   a. 1280x1024 1.3 MP
   b. 1280x720 HDTV - 720p
   c. 1024x768 XGA
   d. 800x600 SVGA
   e. 704x570 PAL
   f. 704x480 NTSC
   g. 640x480 VGA
   h. 352x288 CIF
   i. 320x240 SIF
4. Data Transmission:
   a. Data rate: bit rate control from 100Kbps to 10Mbps bit rate control available for full view, multi view, and archive unthrottled bandwidth up to 55Mbps.
   b. Video frame rate up to: 88fps @ 800x600; 22fps @1600x1200; 5.5fps@ 6400x1200.
   c. Compression type: H.264 (MPEG4, Part 10); Motion JPEG; 21 levels of quality.
   d. TFTP, HTTP, RTSP, RTP/TCP, RTP/UDP image transmission protocols.
   e. 100 Base-T Ethernet Network Interface.
   f. Multi-streaming: 8 non-identical streams.
5. Programmability:
   a. Auto Exposure (AE) and Gain Control (AGC) >120dB.
   b. On-camera real-time motion detection with 64 detection zones.
   c. Programmable backlight compensation.
   d. Auto multi-matrix white balance.
   e. 50/60Hz selectable flicker control.
   f. Electronic pan, tilt, zoom (PTZ).
   g. Electronic image flip - 180 degree rotation.
   h. Resolution windowing down to 32x32 pixels window.
   i. Programmable shutter speed to minimize motion blur.
   j. Mode to extended exposure and proprietary noise cancellation.
   k. Programmable resolution, brightness, saturation, gamma, sharpness, tint.
   l. Picture-in-Picture: simultaneous delivery of full field of view and zoomed images.
   m. Bandwidth & storage savings by running at 1/4 resolution.
6. Electrical:
   a. General purpose opto-coupled input and output.
   b. Power over Ethernet (PoE): PoE 802.3af.
   c. DC input: auxiliary 12V-48V DC.
   d. AC input: auxiliary 24V AC.

e. Power consumption 4.5 Watts maximum

7. Mechanical:
   a. Dimensions(H x W x D): 3”W (76 mm) x 2.5”H (63.5 mm) x 2.25”D (57mm) (w/o lens).
   b. Weight: 8.6 oz (243 grams) (w/o lens).
   c. Lens: C/CS lens mount.
8. Environmental :
   a. Operating temperature 0°C (32 °F) to +50°C (122 °F).
   b. Storage temperature -20°C (-4 °F) to +60°C (140 °F).
   c. Humidity 0% to 90% (non condensing)

C. Panoramic Megapixel IP Cameras: The 360 degree panoramic camera is dual encoder (H.264 & MJPEG), 8 Megapixel resolution, IP addressable camera. It is designed to deliver full motion high definition progressive scan digital video across local area networks. The camera is PoE (IEEE 802.3af) compliant. The camera has the ability to output multiple image formats allowing the simultaneous viewing of the full resolution field of view and regions of interest for high definition forensic zooming. The panoramic megapixel camera must meet the following operating requirements

1. Operational:
   a. Imaging Four 2 megapixel CMOS image sensors. 1/2” optical format.
   b. Bayer mosaic RGB filter
   c. Active Pixel Count: 1600(H) x 1200(V) pixel array per sensor. 6400(H) x 1200(V) pixels across all four sensors.
   d. Minimum Illumination Color: 0.2 Lux @ F2.0
   e. Dynamic range 61 dB
   f. Maximum SNR 50 dB
2. Full Field of View (FOV) Resolutions per Sensor:
   a. 1600(H) x 1200(V) at 2 megapixel.
   b. 800(H) x 600(V) at 1/4 resolution.
3. Cropped Field of View Resolutions per Sensor:
   a. 1280x1024 1.3 MP
   b. 1280x720 HDTV - 720p
   c. 1024x768 XGA
   d. 800x600 SVGA
   e. 704x570 PAL
   f. 704x480 NTSC
   g. 640x480 VGA
   h. 352x288 CIF
   i. 320x240 SIF
4. Data Transmission:
   a. Data rate: bit rate control from 100Kbps to 10Mbps bit rate control available for full view, multi view, and archive unthrottled bandwidth up to 55Mbps.
   b. Video frame rate up to: 88fps @ 800x600; 22fps @1600x1200; 5.5fps@ 6400x1200.
   c. Compression type: H.264 (MPEG4, Part 10); Motion JPEG; 21 levels of quality.
   d. TFTP, HTTP, RTSP, RTP/TCP, RTP/UDP image transmission protocols.
   e. 100 Base-T Ethernet Network Interface.
   f. Multi-streaming: 8 non-identical streams.
5. Programmability:
   a. Auto Exposure (AE) and Gain Control (AGC) >120dB.
   b. On-camera real-time motion detection with 64 detection zones.
   c. Programmable backlight compensation.
   d. Auto multi-matrix white balance.
   e. 50/60Hz selectable flicker control.
   f. Electronic pan, tilt, zoom (PTZ).
   g. Electronic image flip - 180 degree rotation.

h. Resolution windowing down to 32x32 pixels window.
i. Programmable shutter speed to minimize motion blur.
j. Mode to extended exposure and proprietary noise cancellation.
k. Programmable resolution, brightness, saturation, gamma, sharpness, tint.
l. Picture-in-Picture: simultaneous delivery of full field of view and zoomed images.
m. Bandwidth & storage savings by running at 1/4 resolution.

6. Electrical:
   a. General purpose opto-coupled input and output.
   b. Power over Ethernet (PoE): PoE 802.3af.
   c. DC input: auxiliary 12V-48V DC.
   d. AC input: auxiliary 24V AC.
   e. Power consumption 9 Watts maximum
7. Mechanical:
   a. Dimensions(H x W x D): 6.49”H (164.8 mm) x 6.0” dia. (152.4 mm).
   b. Weight: 4 lbs (1815g).
   c. Lens: C lens mount – Four 4mm lenses included.
8. Environmental :
   a. Operating temperature 0℃ (32 °F) to +50℃ (122 °F).
   b. Storage temperature -20℃ (-4 °F) to +60℃ (140 °F).
   c. Humidity 0% to 90% (non condensing)

2.4 LENSES

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following]
   1. American Dynamics.
   2. CNB Technology Inc.
   3. Arecont Technologies, Inc.
   4. Axis.
   5.

B. Description: Optical-quality coated lens, designed specifically for video-surveillance applications and matched to specified camera. Provide color-corrected lenses with color cameras.
   1. Auto-Iris Lens: Electrically controlled iris with circuit set to maintain a constant video level in varying lighting conditions.
   2. Fixed Lens: With calibrated focus ring.
   3. Varifocal Lens:

2.5 POWER SUPPLIES

A. Low-voltage power supplies matched for voltage and current requirements of cameras and accessories, and of type as recommended by manufacturer of camera and lens.
   1. Enclosure: NEMA 250, Type 1 for indoor use and Type 3R for outdoor use.

B. PoE:

2.6 CAMERA-SUPPORTING EQUIPMENT

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following
   1. American Dynamics.
   2. CNB Technology Inc.
   3. Axis.
   4. Arecont.

B. Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.

C. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.

D. Protective Housings for Fixed and Movable Cameras: Steel or 6061 T6 aluminum enclosures with internal camera mounting and connecting provisions that are matched to camera/lens combination and mounting and installing arrangement of camera to be housed.
1. Tamper switch on access cover sounds an alarm signal when unit is opened or partially disassembled. Central-control unit shall identify tamper alarms and indicate location in alarm display. Tamper switches and central-control unit are specified in Division 28 Section "Intrusion Detection."
2. Camera Viewing Window: Polycarbonate or Lexan window, aligned with camera lens.
3. Duplex Receptacle: Internally mounted.
4. Alignment Provisions: Camera mounting shall provide for field aiming of camera and permit removal and reinstallation of camera lens without disturbing camera alignment.
5. Built-in, thermostat-activated heater units. Units shall be automatically controlled so the environmental limits of the camera equipment are not exceeded.
6. Sun shield shall not interfere with normal airflow around the housing.
7. Mounting bracket and hardware for wall or ceiling mounting of the housing. Bracket shall be of same material as the housing; mounting hardware shall be stainless steel.
8. Finish: Housing and mounting bracket shall be factory finished using manufacturer's standard finishing process suitable for the environment.
9. Enclosure Rating: NEMA Type 4.

2.7 MONITORS

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following
1. Bosch Security Systems, Inc.
2. CBC (AMERICA) Corp.
3. Hitachi, Ltd.
4. Honeywell International Inc.; Honeywell Video Systems.
5. JVC Americas Corp.; JVC Professional products.
6.
7. Panasonic Corporation of North America; Panasonic Security Systems.
8. Samsung Opto-Electronics.
9. Tyco International Limited; Sensormatic products.

B. LCD Color Monitor:
1. Metal cabinet units designed for continuous operation.
2. Screen Size (Horizontal Dimension): As noted on drawings.
3. Resolution: 1080p
4. Dynamic Contrast Ratio: 150,000:1.
5. Response Time: 4ms.
6. Audio: SR5 Theater Sound; 10Wx2 Sound Output.
7. Input/Output:
   a. 4ea. HDMI.
   b. 1ea. Composite (AV).
   c. 2ea. Component.
   d. 2ea. USB.
   e. 1ea. Ethernet.
   f. 1ea. PC input (D-sub).
8. Minimum Front Panel Devices and Controls: Power switch; power-on indicator; and brightness, contrast, color, and tint controls.

9. USB 2.0 (mpeg support).
10. Built in system tuners.
11. Mounting: As noted on drawings.
12. Electrical: 120-V ac, 60 Hz.

2.8 DIGITAL VIDEO RECORDERS

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following
   1. ExacqVision
   2.

B. Description: Digital, time-lapse type, full-frame and motion recorder, with removable hard drive.
   1. Recording Time: 400 hours minimum.
   2. Resolution: 720 by 480 lines, minimum.
   3. Programming shall be from trackball and push buttons on face of the recorder, settings shall be displayed on any video monitor connected to the recorder. Programming shall include the following:
      a. Motion analysis graph.
      b. Password protection.
      c. Alarm and timer controls.
      d. Continuous recording option.
      e. Time-lapse operating modes.
      f. Search video by time, event, or motion.
   4. Programming: SmartMedia card for software updating, image archiving, and image transfer to a PC.
   5. Storage: 15TB, removable hard drive. Software shall permit hot-swapping drives.
   6. Compression: MPEG-2/MPEG-4.
   7. Time and Date Generator: Records time (hr:min:sec) and date legend of each frame.
   8. Audio Recording: 70 to 7000 Hz. Phono and microphone input; phono output.
   9. Mounting: Standard 19-inch (483-mm) rack complying with CEA 310-E, or freestanding desktop.

2.9 NETWORK VIDEO RECORDERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. ExacqVision
   2.

B. Description: Digital, time-lapse type, full-frame and motion recorder, with removable hard drive.
   1. External storage or internal 250-1, 500-GB hard disk drive.
   2. Video and audio recording over TCP/IP network.
   3. Video recording of MPEG-2, MPEG-4, and H.264 streams.
   4. Video recording up to 48 Mbps for internal storage and up to 100 Mbps for external storage.
   5. Duplex Operation: Simultaneous recording and playback.
   6. Continuous and alarm-based recording.
   7. Full-Featured Search Capabilities: Search based on camera, time, or date.
   8. Automatic data replenishment to ensure recording even if network is down.
   9. Digital certification by watermarking.
   10. Internal RAID storage or non-RAID storage of up to 1500 GB.
   11. Capable of adding external RAID storage up to 7000 GB for models with no internal storage.
   12. Full integration with LAN, Intranet, or Internet through standard Web browser or video management software.

13. Integrated Web server FTP server functionality.
14. Supports up to 64 devices.

C. IP Sever Network Video Recorder Hardware features:
1. The IP Server hardware shall operate on either the Microsoft XP Pro or Linux operating systems.
2. The IP Server shall be capable of simultaneously recording, displaying and playing back digitized video from IP cameras and analog cameras through the use of a video encoder. IP Server models shall be capable of being licensed to add IP cameras in increments from one (1) to sixty four (64) camera licenses.
3. The IP Server shall support recording resolutions from CIF to 5 megapixel and shall be user selectable. MJPEG, MPEG-4 and H.264 video compression format shall be user selectable depending on the IP camera configured to the IP Server. Video recording shall be available at up to 30 images per second per input channel depending on IP camera type selected.
4. Each IP Server shall have serial port capabilities to communicate with serial devices such as point of sale (POS) terminals and automated teller machines (ATM). Once the serial device is connected to the serial port with a cable the serial port shall be configured. Transaction data shall be received from each serial device into a text database and associated with recorded video. User shall be able to search transaction data to locate the associated video.
5. Each IP Server shall have a serial port capable of communicating with pan-tilt-zoom (PTZ) cameras.
6. Each IP Server shall have a 1Gbit 1000Base T RJ-45 Ethernet connection for networking to Remote PC Clients. Multiple servers shall be accessible by multiple clients located anywhere on the network. Each server shall record video, audio, and text while displaying live video or playback video. In the event that there is no client actively attached to the server, the server shall continue to record video and audio, monitor events and all other server functions.
7. Recorded video shall be triggered by the motion detection sensor of the IP camera, an external input device, or in continuous record mode.
8. Each IP Server shall have the capability of automatically exporting a predetermined time frame of video to the internal DVD/CD device upon an external trigger input connected to the server. Such input shall export to the DVD/CD device a user defined amount of video and video camera source both pre and post event schedulable to the maximum capacity of the DVD/CD media selected.
9. Each IP Server shall have ability to link specific events in an “if-then” scenario. Linked events types shall include video motion, video loss, input trigger, POS port, POS profile and temperature. Sources of these events shall be any camera connected to the specific server. Action from these events shall include record video, record audio, enable output trigger, output video, notify (send e-mail), and output video to DVD.
10. IP Server hardware shall have an internal DVD/CD device that will allow the server to export video clips to the device in Standalone.Exe (*exe), AVI Files (*.avi) and PS Files (*ps) formats.
11. A Raid 5 option shall be available consisting of a 4U chassis and eight hot swappable hard drives. The Raid 5 option shall be internal to the server and shall provide notification of a drive failure to the administrator.

D. 4U Rackmount IP Server. All 4U Rackmount IP Servers shall have the following specifications:
1. Dimensions (L x W x H):(25.55” x 19.0” x 7.0”) (64.897 x 48.26 x 17.78 cm).
2. Weight: 31.70 – 35.10 lbs. (13.0 – 14.6 kg).
3. Input Voltage: 120 VAC.
4. Power Consumption: 500 watts.
5. Recording Resolution: CIF to 5 megapixel.
6. Compression: MJPEG, MPEG-4 or H.264 by camera or encoder.
7. Serial Connections: 1 serial port.

8. NIC: 1Gbit 1000Base T RJ-45.
9. USB2 Ports: 8 (2 front, 6 rear).
10. Hard Drive Storage: Enterprise Class 8000GB.
11. VGA Output1 VGA (DB15).
12. Keyboard & Mouse: Yes.
13. DVD/CD RW: Front panel access.
14. Operating System: Windows XP Pro, Linux - optional.
15. Operating Temperature: 40° -95°F (4.5° – 35°C).
16. Relative Humidity: 5 – 95% RH (non-condensing).

2.10 VIDEO MANAGMENT SYSTEM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ExacqVision (or pre-approved equivalent)
2. Axis (or pre-approved equivalent)

B. Description: The Video Management System (VMS) software shall have features for viewing live and recorded video from IP cameras and video encoders connected to a local and wide area network. The VMS software shall have a Client-Server based architecture that can be configured as a standalone VMS system with the Client software running on the server hardware and/or the Client running on any network connected TCP/IP PC workstation. Multiple client workstations shall be capable of simultaneously viewing live and/or recorded video from a single or multiple servers. Multiple servers shall also be able to simultaneously provide live and/or recorded video to a single or multiple workstation(s). The system software shall include but not be limited to the following software applications.
1. IP Camera and Encoder Support.
2. VMS Client Server Architecture.
3. VMS Client Software.
4. Client Browser.
5. VMS Client on Multiple Monitors.
6. VMS Server Software.
7. Standalone Client/Server.
8. IP Camera based Motion Detection.
9. Licensing VMS Software.
10. The VMS server software shall run as a service. If the VMS Client software is shut down the VMS server software service shall continue to record video and perform all other configured functions.
11. Installing and Updating VMS Client Software.
12. Installing and Updating VMS Server+Client Software.

C. VMS Software Features:
1. Operating Modes: The VMS software shall have three main modes of operation depicted by three icons. Clicking on any of these icons below shall change the mode of operation:
a. Live Display Mode Icon allows users the ability view live video.
b. Search Mode Icon allows users the ability to search for recorded video.
c. Setup Mode Icon allows Administrators and Power Users the ability configure systems.
2. Live Display Mode Features. A live display mode shall have features for users to view live video. The live display mode shall have the following features to navigate and view live video:
a. Layout Icons.
b. Navigation Tree.
c. Navigation Panel.
d. Video View Panel.
e. About Icon.

f. Help Icon.
g. Show/Hide Navigation Tree Icon.
h. Full Screen Icon.
i. PTZ Control Icon.
j. Date and Time.

3. Pan, Tilt & Zoom (PTZ) Controls. The VMS software shall control PTZ cameras and have features to maneuver both a mechanical PTZ camera and digitally pan, tilt and zoom on any video. Six methods of controlling a PTZ camera shall be available:
   a. PTZ graphics control windows.
   b. Live graphic overlay PTZ control icons.
   c. PC keyboard control (Up, Down, Left, Right Arrows & Page Up / Down for Zoom In/Out).
   d. PTZ Presets.
   e. Digital PTZ.
   f. USB Joystick to control PTZ cameras.
4. Auto Replay of Recorded Video from Live Display Mode.
5. Virtual Matrix Switching.
6. Event Monitoring.
7. Viewing Logical Camera Groups.
8. Creating, Saving and Accessing Views.
9. Video Tours.
10. Search Mode Overview. The VMS software shall have features to search for and playback recorded video, audio and events from a VMS servers. The system must also be capable of performing searches on multiple camera based on a given criteria. The VMS search software shall have the following features:
    a. Input Selection Tree.
    b. Navigation Panel.
    c. Video Time Line. Zoom In (+) and Zoom Out (-) Buttons. Camera Selection List. Recorded Bar. Video Playback Controls.
    d. Calendar.
    e. Start Search Time.
    f. Search Button.
    g. Video Playback Window.
    h. Export Buttons.
    i. Scrub Bar & Scrub Handle.
    j. Stop Download Button.
11. Multi Camera Search and Playback.
12. Audio Search and Playback.
13. Exporting Files.
14. Copy, Save and Print Images.
15. Standalone Player. The VMS software shall have the capability to export video and audio files with an executable Standalone Player. Double clicking on the executable Standalone Player shall start the application and open the video and/or audio files. The Standalone Player shall have the following features:
    a. Screen Layouts.
    b. Video Playback Controls – there shall be seven playback controls.
    c. Scrub Bar & Scrub Handle.
    d. Camera & Audio Controls.
    e. File:
    f. Options:
       1) Show Camera Name.
       2) Show Timestamp.
       3) Show Status Boarder.
       4) Time-lapse Playback Interval.
       5) Show Camera Tree.
       6) Show Full Screen.

7) Font.
g. Tools.
1) Authenticate.
h. Right Click on Video.
1) Clear this video panel.
2) Digital PTZ.
16. Setup Mode Overview and Features.
a. My Systems.
b. Adding System.
c. Client Setup.
d. Joystick Setup.
e. Event Monitoring.
f. Group Setup.
g. System Information.
h. System Setup.
i. Add IP Cameras.
j. IP Camera Recording Setup.
k. IP Camera Setup.
l. Audio Input Setup.
m. Trigger Input Setup.
n. Alarm Output Setup.
o. Storage Setup.
p. Serial Profile Setup.
q. Serial Port Setup.
r. Notifications.
s. Instant Recall Setup.

2.11 IP VIDEO SYSTEMS

A. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers. Retain one of first two paragraphs and list of manufacturers below. See Division 01 Section "Product Requirements."

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ExacqVision
2. Axis.
3.

C. Description:
1. System shall provide high-quality delivery and processing of IP-based video, audio, and control data using standard Ethernet-based networks.
2. System shall have seamless integration of all video surveillance and control functions.
3. Graphical user interface software shall manage all IP-based video matrix switching and camera control functions, two-way audio communication, alarm monitoring and control, and recording and archive/retrieval management. IP system shall also be capable of integrating into larger system environments.
4. System design shall include all necessary compression software for high-performance, dual-stream, MPEG-2/MPEG-4 and H.264 video. Unit shall provide connections for all video cameras, camera PTZ control data, bidirectional audio, discreet sensor inputs, and control system outputs.
5. All camera signals shall be compressed, encoded, and delivered onto the network for processing and control by the IP video-management software.
6. Camera system units shall be ruggedly built and designed for extreme adverse environments, complying with NEMA Type environmental standards.

7. Encoder/decoder combinations shall place video, audio, and data network stream that can be managed from multiple workstations on the user's LAN or WAN.
8. All system interconnect cables, workstation PCs, PTZ joysticks, and network intermediate devices shall be provided for full performance of specified system.

2.12 SIGNAL TRANSMISSION COMPONENTS

A. Cable: Coaxial cable elements have 75-ohm nominal impedance. Comply with requirements in Division 28 Section "Conductors and Cables for Electronic Safety and Security."

B. Video Surveillance Coaxial Cable Connectors: BNC type, 75 ohms. Comply with requirements in Division 28 Section "Conductors and Cables for Electronic Safety and Security."

C. Ethernet Cables:

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.

B. Examine roughing-in for LAN, WAN, and IP network before device installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING

A. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Install cables in raceways unless otherwise indicated.
1. Except raceways are not required in accessible indoor ceiling spaces and attics.
2. Except raceways are not required in hollow gypsum board partitions.
3. Conceal raceways and wiring except in unfinished spaces.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

E. For LAN connection and fiber-optic and copper communication wiring, comply with Division 27 Sections "Communications Backbone Cabling" and "Communications Horizontal Cabling."

F. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

A. Install cameras and infrared illuminators level and plumb.

B. Install cameras with 84-inch- (2134-mm-) minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.

C. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.

D. Install power supplies and other auxiliary components at control stations unless otherwise indicated.

E. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system-component enclosures and mounted in self-protected, inconspicuous positions.

F. Avoid ground loops by making ground connections only at the control station.
1. For 12- and 24-V dc cameras, connect the coaxial cable shields only at the monitor end.

G. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:
1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
   a. Prepare equipment list described in "Submittals" Article.
   b. Verify operation of auto-iris lenses.
   c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
   d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet (17 to 23 m) away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
   e. Set and name all preset positions; consult Owner's personnel.
   f. Set sensitivity of motion detection.
   g. Connect and verify responses to alarms.
   h. Verify operation of control-station equipment.
3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.

4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

E. Video surveillance system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to 3 visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:
1. Check cable connections.
2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
3. Adjust all cameras lens varifocal ranges for desired field of view; consult Owner's personnel.
4. Adjust all preset positions; consult Owner's personnel.
5. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
6. Provide a written report of adjustments and recommendations.

3.6 CLEANING

A. Clean installed items using methods and materials recommended in writing by manufacturer.

B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION 282300

SECTION 31 0501

COMMON EARTHWORK REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited to:
   1. General procedures and requirements for earthwork.

1.2 REFERENCES

A. Definitions:
   1. Aggregate Base: Layer of granular material immediately below concrete and asphalt paving or miscellaneous site concrete (sidewalks, curbs, etc) and below interior concrete slabs on grade.
   2. Building Grading: sloping of grounds immediately adjacent to building. Proper grading causes water to flow away from a structure. Grading can be accomplished either with machinery or by hand.
   3. Compacted Fill: Placement of soils on building site placed and compacted per Contract Documents. Used to replace soils removed during excavation or to fill in low spot on building site.
   4. Excavation: Removal of soil from project site or cavity formed by cutting, digging or scooping on project site.
   5. Fine Grading (FG): Preparation of subgrade preceding placement of surfacing materials for contour of building site required. Fine Grading is conducted to ensure that earth forms and surfaces have been properly shaped and subgrade has been brought to correct elevations. It is performed after rough grading and placement of compacted fill.
   6. Finish Grading: Completed surface elevation of landscaping areas for seeding, sodding, and planting on building site.
   7. Natural Grade: Undisturbed natural surface of ground.
   8. Rough Grading (RG): Grading, leveling, moving, removal and placement of existing or imported soil to its generally required location and elevation. Cut and fill is part of rough grading.
   9. Subgrade: Grade established in preparation for top surfacing of roads, topsoil, etc.
   10. Topsoil Placement and Grading: Topsoil placement and finish grading work required to prepare site for installation of landscaping.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference for common earthwork sections:
      a. Schedule conference after completion of site clearing but before beginning grading work.
      b. Participate in pre-installation conference held jointly with following sections:
         1) Section 31 1123: ‘Aggregate Base’.
         2) Section 31 2316: ‘Excavation’.
         3) Section 31 2323: ‘Fill’.
      c. In addition to agenda items specified in Section 01 3100, review following:
         1) Review common earthwork schedule.
         2) Review protection requirements.
         3) Review cleaning requirements.
         4) Review safety issues.
         5) Review field tests and inspections requirements.

B. General Earthwork Sequencing:

1. Excavation.
2. Rough Grading.
3. Compacted Fill.
4. Fine Grading.
5. Aggregate Base.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Forty eight (48) hours minimum before performing any work on site, contact Blue Stakes to arrange for utility location services.
   2. Upon discovery of conflicts or problems with existing facilities, notify Architect by phone or fax within twenty four (24) hours. Follow telephone or fax notification with letter and diagrams indicating conflict or problem and sufficient measurements and details to evaluate problem.

3.2 PREPARATION

A. Protection:
   1. Spillage:
      a. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
      b. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
   2. Dust Control:
      a. Take precautions necessary to prevent dust nuisance, both on-site and adjacent to public and private properties.
      b. Correct or repair damage caused by dust.
   3. Existing Plants And Features:
      a. Do not damage tops, trunks, and roots of existing trees and shrubs on site that are intended to remain.
      b. Do not use heavy equipment within branch spread.
      c. Interfering branches may be removed only with permission of Architect.
      d. Do not damage other plants and features that are to remain.

3.3 REPAIR / RESTORATION

A. Adjust existing covers, boxes, and vaults to grade.

B. Replace broken or damaged covers, boxes, and vaults.

C. Independently confirm size, location, and number of covers, boxes, and vaults that require adjustment.

3.4 FIELD QUALITY CONTROL

A. Field Tests:
   1. Owner reserves right to require additional testing to re-affirm suitability of completed work including compacted soils that have been exposed to adverse weather conditions.

B. Field Inspections:
   1. Notify Architect forty eight (48) hours before performing excavation or fill work.
   2. If weather, scheduling, or any other circumstance has interrupted work, notify Architect twenty four (24) hours minimum before intended resumption of grading or compacting.

C. Non-Conforming Work:
   1. If specified protection precautions are not taken or corrections and repairs not made promptly, Owner may take such steps as may be deemed necessary and deduct costs of such from monies due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from responsibility for proper protection of The Work.

END OF SECTION

B L A N K P A G E

SECTION 31 1123

AGGREGATE BASE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install the following as described in Contract Documents:
      a. Aggregate Base:
         1) Interior and exterior slabs-on-grade concrete.

B. Related Requirements:
   1. Section 01 1200: Multiple contracts.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 6200: Administrative and procedural requirements for product options.
   7. Section 01 7800: 'Closeout Submittals'.
   8. Section 31 0501: 'Common Earthwork Requirements':
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   9. Section 31 2323: Compaction procedures and tolerances.

1.2 REFERENCES

A. Association Publications:
   1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
   2. International Code Council (IBC):
      a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions:
   1. Gravel (Concrete Paving):
      a. Gravel: Material passing 75-mm (3-inch) sieve and retained on 4.75-mm (No. 4) sieve.
      b. Coarse Gravel: Material passing 75-mm (3-inch) sieve and retained on 19.0-mm (3/4-inch) sieve.
      c. Fine Gravel: Material passing 19.0-mm (3/4-inch) sieve and retained on 4.75-mm (No. 4) sieve.
      d. Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is required to pass.
      e. Nominal Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is permitted to pass.
   2. Sand (Concrete Paving):
      a. Sand: Material passing 4.75-mm sieve (No. 4) and retained on 0.075-mm (No. 200) sieve.
      b. Coarse Sand: Material passing 4.75-mm sieve (No. 4) and retained on 2.00-mm (No. 10) sieve.
      c. Medium Sand: Material passing 2.00-mm sieve (No. 10) and retained on 0.475-mm (No. 40) sieve.

d. Find Sand: Material passing 0.475-mm (No. 40) sieve and retained on 0.075-mm (No. 200) sieve.
e. Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is required to pass.
f. Nominal Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is permitted to pass.

C. Definitions (Following are specifically referenced for testing):
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Approved: To authorize, endorse, validate, confirm, or agree to.
3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
4. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
   a. Inspection: Not required by code provisions but may be required by Contract Documents.
   b. Special Inspection: Required by code provisions and by Contract Documents.
   c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
5. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
6. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
8. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards..
9. Relative Compaction: Ratio of field dry density as determined by ASTM D6938 or ASTM D2216, and laboratory maximum dry density as determined by ASTM D1557.
10. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
11. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
12. Service Provider: Agency or firm qualified to perform required tests and inspections.
13. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
14. Special Inspection: See Inspection.
15. Special Inspector: Certified individual or firm that implements special inspection program for project.
16. Special Test: See Test.
17. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
   a. Test: Not required by code provisions but may be required by Contract Documents.
   b. Special Test: Required by code provisions and by Contract Documents.
18. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
19. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.

20. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

D. Reference Standards:
   a. ASTM C117-04, 'Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing'.
   b. ASTM C131-06, 'Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine'.
   c. ASTM C136-06, 'Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates'.
   d. ASTM C1077-11b, 'Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation'.
   e. ASTM D698-07e1, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))'.
   f. ASTM D1556-07, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
   g. ASTM D1557-09, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))'.
   h. ASTM D2216-10, 'Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass'.
   i. ASTM D2419-09, 'Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.
   j. ASTM D2487-11, 'Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)'.
   k. ASTM D3666-09a, 'Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.
   l. ASTM D3740-11, 'Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction'.
   m. ASTM D6938-10, 'Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)'.
   n. ASTM E11-09e1, 'Standard Specification for Wire Cloth and Sieves for Testing Purposes'.
   o. ASTM E329-11b: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
   p. ASTM E543-09, 'Standard Specification for Agencies Performing Nondestructive Testing'.
   q. ASTM E1212-09, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 31 0501.
   2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
      a. Review aggregate base installation requirements.
      b. Review proposed concrete paving schedule.

B. Sequencing:
   1. Compaction as described in Section 31 2323 'Fill'.
   2. Aggregate Base:
      a. Install aggregate base at location shown in Contract Drawings.
   3. Concrete Slab is installed.

C. Scheduling:
   1. Interior slab-on-grade concrete:
      a. Notify Architect twenty four (24) hours minimum before installation of concrete to allow inspection of vapor retarder installation.
      b. Notify Testing Agency and Architect twenty four (24) hours minimum before installation of interior concrete slabs to allow inspection of aggregate base.

c. Allow special inspector to review all sub grades and excavations to determine if building pad has been prepared in accordance with geotechnical report prior to placing any aggregate base.

1.4 SUBMITTALS

A. Action Submittals:
1. Design Data:
a. Submit Mix Designs

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Testing and Inspection Reports:
a) Testing Agency Testing and Inspecting Reports of aggregate base.

1.5 QUALITY ASSURANCE

A. Testing and Inspection.
1. Owner will provide Testing and Inspection for aggregate base:
a. See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Materials shall be stockpiled in locations agreed upon with Owner.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not perform work during unfavorable conditions as specified below:
a. Aggregate Base:
1) Presence of free surface water.
2) Over-saturated sub base materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate Base:
1. Interior slab-on-grade concrete:
a. Gravel: 3/4 inch 18mm minimum to one inch 25 mm maximum well-graded, clean gravel or crushed rock.
b. Base type gravel or crushed rock, graded by weight as follows (three-quarter to one-inch clean gap-graded gravel):
1) Road Base type gravel or crushed stone, graded as follows:

a) Sieve			Percent of Weight Passing
(1)	1 inch	(25.4 mm)	100
(2)	3/4 inch	(19.0 mm)	15 – 20

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation (Miscellaneous Exterior Concrete):
   1. Subgrade:
      a. Finish grade to grades required by Contract Documents.
      b. Compact subgrade as specified in Section 31 2323.

3.2 INSTALLATION

A. Aggregate Base:
   1. Interior slab-on-grade concrete:
      a. Place 4 inches (100 mm) minimum of aggregate base, level, and compact as specified in Section 31 2323.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
   1. Aggregate Base
      a. Interior slab-on-grade concrete areas:
         1) Testing Agency shall provide testing and inspection for interior aggregate base.
         2) Number of tests may vary at discretion of Architect.
         3) Testing Agency will test compaction of base in place according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
            a) Building Slab Areas: One test for every 2,500 sq. ft. (232 sq. m) or less of building slab area but no fewer than three tests.
      b. Miscellaneous exterior concrete areas:
         1) Testing Agency shall provide testing and inspection for exterior aggregate base.
         2) Number of tests may vary at discretion of Architect.
         3) Testing Agency will test compaction of base in place according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
            a) Sitework Areas: One test for every 10,000 sq. ft. (930 sq. m) or less of exterior pads area but no fewer than three tests.

END OF SECTION

B L A N K P A G E

SECTION 31 2316

EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform Project excavating and trenching as described in Contract Documents, except as specified below.
   2. Procedure and quality for excavating and trenching performed on Project under other Sections unless specifically specified otherwise.

B. Related Requirements:
   1. Section 31 0501: Common Earthwork Requirements:
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   2. Section 31 1123: 'Aggregate Base'.
   3. Section 31 2323: 'Fill'.
   4. Performance of excavating inside and outside of building required for electrical and mechanical work is responsibility of respective Section doing work unless arranged differently by Contractor.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 31 0501:
   2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
      a. Review protection of existing utilities requirements.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Carefully examine site and available information to determine type soil to be encountered.
   2. Discuss problems with Architect before proceeding with work.

3.2 PREPARATION

A. Protection of Existing Utilities:
   1. Protect existing utilities identified in Contract Documents during excavation.
   2. If existing utility lines not identified in Contract Documents are encountered, contact Architect before proceeding.

3.3 PERFORMANCE

A. Excavation:
   1. Building Footings And Foundations:
      a. Excavate as necessary for proper placement and forming of footings and foundations.
      b. Bottom of excavations to receive footings shall be undisturbed soil.
      c. Excavation Carried Deeper Than Required:
         1) Under Footings: Fill with concrete specified for footings.
         2) Under Slabs: Use specified compacted backfill material.
   2. Pavement And Miscellaneous Cast-In-Place Concrete:
      a. Excavate as necessary for proper placement and forming of concrete site elements and pavement structure. Remove vegetation and deleterious material and remove from site.
      b. Backfill over-excavated areas with compacted base material specified in Section 31 1123.
      c. Remove and replace exposed material that becomes soft or unstable.
   3. If unusual excavating conditions are encountered, stop work and notify Architect.

3.4 REPAIR / RESTORATION

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

3.5 CLEANING

A. Debris and material not necessary for Project are property of Contractor and are to be removed before completion of Project. However, if material necessary for Project is hauled away, replace with specified fill / backfill material.

END OF SECTION

SECTION 31 2323

FILL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform Project backfilling and compacting as described in Contract Documents, except as specified below.
   2. Procedure and quality for backfilling and compacting performed on Project under other Sections unless specifically specified otherwise.

B. Related Requirements:
   1. Section 01 1200: Multiple contracts.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 7800: 'Closeout Submittals'.
   7. Section 31 0501: 'Common Earthwork Requirements':
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   8. Section 31 1123: 'Aggregate Base'.
   9. Section 31 2316: 'Excavation'.
   10. Performance of backfilling and compacting inside and outside of building required for electrical and mechanical work is responsibility of respective Section doing work unless arranged differently by Contractor.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 229R-99, *Controled Low-Strength Materials* (Reapproved 2005).
   2. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
   3. International Code Council (IBC):
      a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions (Following are specifically referenced for testing):
   1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
   2. Approved: To authorize, endorse, validate, confirm, or agree to.
   3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.

4. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
   a. Inspection: Not required by code provisions but may be required by Contract Documents.
   b. Special Inspection: Required by code provisions and by Contract Documents.
   c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
5. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
7. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
8. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
9. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
10. Relative Compaction: Ratio of field dry density as determined by ASTM D6938 or ASTM D2216, and laboratory maximum dry density as determined by ASTM D1557.
11. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
12. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
13. Service Provider: Agency or firm qualified to perform required tests and inspections.
14. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
15. Special Inspection: See Inspection.
16. Special Inspector: Certified individual or firm that implements special inspection program for project.
17. Special Test: See Test.
18. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
    a. Test: Not required by code provisions but may be required by Contract Documents.
    b. Special Test: Required by code provisions and by Contract Documents.
19. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
20. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
21. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
   1. ASTM International (Following are specifically referenced for fill and aggregate base testing):
      a. ASTM D698-07e1, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))'.
      b. ASTM D1556-07, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
      c. ASTM D1557-09, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))'.

d. ASTM D2167-08, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method'.
e. ASTM D2216-10, 'Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass'.
f. ASTM D2487-11, 'Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)'.
g. ASTM D3666-09a, 'Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.
h. ASTM D3740-11, 'Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction'.
i. ASTM D6938-10, 'Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)'.
j. ASTM E329-11b: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
k. ASTM E543-09, 'Standard Specification for Agencies Performing Nondestructive Testing'.
l. ASTM E1212-09, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 31 0501.
   2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
      a. Review backfill requirements.
      b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review frequency of testing and inspections.

B. Sequencing:
   1. Do not backfill against bituminous dampproofing for twenty four (24) hours after application of dampproofing.
   2. Before backfilling, show utility and service lines being covered on record set of Drawings. Do not backfill until utilities involved have been tested and approved by Architect and until instructed by Architect.

C. Scheduling:
   1. Notify Testing Agency and Architect twenty four (24) hours minimum before installation of fill / engineered fill to allow inspection.
   2. Allow special inspector to review all subgrades and excavations to determine if site has been prepared in accordance with geotechnical report prior to placing any fill (or concrete).
   3. Allow inspection and testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after inspections and test results for previously compacted work comply with requirements.

1.4 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency Testing and Inspecting Reports of fill / engineered fill.

1.5 QUALITY ASSURANCE

A. Testing and Inspection.
   1. Owner will provide Testing and Inspection for fill / engineering fill:
      a. See Section 01 1200: 'Multiple Contract Summary'.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Site Material:
   1. Existing excavated material on site is suitable for use as fill and backfill to meet Project requirements.

B. Imported Fill / Backfill:
   1. Well graded material conforming to ASTM D2487 free from debris, organic material, frozen materials, brick, lime, concrete, and other material which would prevent adequate performance of backfill.
      a. Under Building Footprint And Paved Areas: Fill shall comply with soil classification groups GW, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches (150 mm) diameter and 90 percent minimum of fill shall be smaller than 1-1/2 inch (38 mm) in any direction.
      b. Under Landscaped Areas:
         1) Fill more than 36 inches (900 mm) below finish grade shall comply with soil classification groups GW, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches (150 mm) diameter and 90 percent minimum of fill shall be smaller than 1-1/2 inch (38 mm) in any direction.
         2) Fill less than 36 inches (900 mm) below finish grade shall comply with soil classification groups SW, SP, SM, or SC. Fill may not contain stones larger than 1-1/2 inches (38 mm) in any direction and 90 percent minimum of fill shall be smaller than 3/8 inch (4.7 mm) in any direction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before placing fill, base, or finish work, prepare subgrade as follows:
   1. Do not place fill or base over frozen subgrade.
   2. Under Building Slabs / Pads, Concrete Site Elements, And Concrete Driveways And Parking Areas: Scarify subgrade 6 inches (150 mm) deep, moisture condition to uniform moisture content of between optimum and 4 percent over optimum, and mechanically tamp 6 inches (150 mm) deep to 90 percent minimum of relative compaction.
   3. Under Asphalt Driveways And Parking Areas: Scarify subgrade 6 inches (150 mm) deep, moisture condition to uniform moisture content between optimum and 4 percent over optimum, and mechanically tamp to 95 percent minimum of relative compaction.
   4. Landscape Areas: Compact subgrade to 85 percent relative compaction.

3.2 PERFORMANCE

A. Fill / Backfill:
   1. General:
      a. Around Buildings And Structures: Slope grade away from building as specified in Section 31 2216. Hand backfill when close to building or where damage to building might result.

2. Compacting:
   a. Fill / Backfill And Base:
      1) Under Building Slabs or Pads, Driveways, And Parking Areas: Place in 8 inch (200 mm) maximum layers, moisture condition to plus or minus 2 percent of optimum moisture content, and mechanically tamp to 95 percent minimum of maximum density as established by ASTM D1557.
      2) Under Concrete Site Elements And Around Foundation Walls: Place in 8 inch (200 mm) maximum layers, dampen but do not soak, and mechanically tamp to 90 percent minimum of maximum density as established by ASTM D1557.
      3) Utility Trenches:
         a) Site: Place fill in 12 inch (300 mm) layers and moisture condition to plus or minus 2 percent of optimum moisture content. Compact fill to 90 percent minimum relative compaction to within 12 inches (300 mm) of finish grade. Compact fill above 12 inches (300 mm) to 85 percent relative compaction.
         b) Under Slabs: Place fill in 6 inch (150 mm) layers, moisture condition to plus or minus 2 percent of optimum moisture content, and compact to 95 percent minimum relative compaction to within 4 inches (100 mm) of finish grade. Final 4 inches (100 mm) of fill shall be aggregate base as specified in Section 31 1123.
      4) Fill Slopes: Compact by rolling or using sheepsfoot roller.
      5) Backfill Under Footings: Not allowed.
      6) Other Backfills: Place other fills in 12 inch (300 mm) layers and compact to 90 percent relative compaction.

3.3 REPAIR / RESTORATION

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
   1. Fill / Engineered Fill:
      a. Testing Agency shall provide testing and inspection for fill.
      b. Number of tests may vary at discretion of Architect.
      c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.
      d. Prior to placement of engineered fill, inspector shall determine that site has been prepared in accordance with geotechnical report.
      e. Footing subgrade: At footing subgrades Certified Inspector is to verify that soils conform to geotechnical report.
      f. Testing Agency will test compaction of soils according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Lift thicknesses shall comply with geotechnical report. Inspector shall determine that in-place dry density of engineered fill material complies with geotechnical report. Tests will be performed at following locations and frequencies:
         1) Paved Areas: At each compacted fill and backfill layer, at least one (1) test for every 10,000 sq. ft. (930 sq. m) or less of paved area but in no case less than three (3) tests.
         2) Building Slab Areas: At each compacted fill and backfill layer, at least on test for every 2,500 sq. ft. (232 sq. m) or less of building slab area but in no case less than three (3) tests.
         3) Foundation Wall/Continuous Footing Backfill: At each compacted backfill layer, at least one (1) test for each 40 linear feet (12 linear m) or less of wall length, but no fewer than two (2) tests.
         4) Trench Backfill: At each 12 inch (305 mm) compacted lift for each 100 linear feet (30.5 linear m) or less of trench length but no fewer than two (2) tests.

5) Sidewalks, Curbs, Gutters, Exterior Pads: Minimum of one (1) test for each lift for each 40 lineal feet (12 linear m) or one (1) test for every 5,000 sq. ft. (465 sq. m) or less of pad area but no fewer than three (3) tests.

g. Required verification and inspection of soils as referenced in 2009 IBC Table 1704.7. Periodic and continuous inspections include:
1) Verify materials below shallow foundations are adequate to achieve design bearing capacity (periodic).
2) Verify excavations are extended to proper depth and have reached proper material (periodic).
3) Perform classification and testing of compacted fill materials (periodic).
4) Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill (continuous).
5) Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly (periodic).

3.5 CLEANING

A. Debris and material not necessary for Project are property of Contractor and are to be removed before completion of Project. However, if material necessary for Project is hauled away, replace with specified fill / backfill material.

END OF SECTION

Question and Answers for Bid #DA14001 - DEPARTMENT OF HEALTH-UPGRADE FIRE RATED CORRIDOR DOORS / 12188390

OVERALL BID QUESTIONS

Question 1

Bidsync has the Pre-bid conference listed as optional. The DFCM RFP has it noted as Mandatory. Please clarify. **(Submitted: Nov 14, 2013 3:30:16 PM MST)**

Answer

- The pre-bid conference is mandatory and bids will not be considered from contractors not in attendance at the pre-bid conference. **(Answered: Nov 14, 2013 4:31:50 PM MST)**

Question Deadline: Dec 5, 2013 3:30:00 PM MST